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EDITORIALS

THE ADMINISTRATION'S TEN YEAR PRESCRIPTION

All members of the Oklahoma State Medical Association would do well to read the Truman inspired and Truman approved ten-year health program prepared by Oscar Ewing, Federal Security Administrator. Furthermore, it is recommended that after a short breathing spell for cogitation, *War, Politics and Insanity* by the English psychiatrist C. S. Bluemel[1] be carefully perused and digested. Wading through the glowing promises of the Truman-Ewing prescription and the hazards of a vulnerable democracy dominated by supercharged politicians of the obsessive-compulsive type as depicted by Bluemel is not a refreshing adventure. On the contrary it engenders a sense of fear and in the mind of the red blooded American, it results in a firm determination to hold fast his remaining personal liberties. Whether the obsessive-compulsive politician is a misguided, conscientious crusader or a designing power-crazed dictator or bureaucrat, trying to butter his bread, makes little difference.

In either case the people stand to lose unless they experience an enlightened awakening, become militant in self defense, and carry the fight to Washington in sufficient strength to change the political psychology before all is lost.

The preposterous fiasco the American people are now facing in the field of medicine is most embarrassing. This is particularly true when the intelligence of the American people and the traditional principles of democratic government are taken into account.

The dominance of Great Britain's socialistic government over medicine already affords an outstanding example of the hazards of government control. Under medicine as a free enterprise the British people enjoyed the protection which vaccination against small pox, vouchsafed by the gift of their great Edward Jenner. But having lost their personal freedom because of an authoritarian government, the entire population, ostensibly under a liberal policy is freed from the necessity of being vaccinated. How can the administration of the National Health Service Act justify such a sweeping change with such catastrophic possibilities.

Shall we empower our own Federal Security Administrator with the authority to do such dangerous things to the citizenry of the United States? An editorial in the New England Medical Journal of September 2 after discussing the plight of the English people under this ridiculous ruling says, "England, in this respect, may now be compared to a city that abandons fireproof building construction because of its fire-fighting equipment that should, under normal conditions, hold in check those conflagrations that are likely to occur."

It seems fitting to supplement this inadequate discussion, intended only as a stimulus and a warning with the following pertinent statements. A letter reproduced in the British Medical Journal of August 21, 1948,[2] under the title "Head Hunters" illustrates the baneful influence of the British National Health scheme.

"Sir,—In his letter on "Reduced Incomes" (*Supplement,* July 17, p. 48) Dr. C. J. Gordon Taylor makes a true but very sad statement that the only way to make a living is to take on patients by the thousand. The Minister pays according to the number of heads on the doctor's list. In other words, we must become head-hunters.

"Those G. P.'s (general practitioners) who have always set themselves a high standard in their everyday work and have taken pride in doing the best for their patients will thus find their incomes reduced. The alternative is to debase these standards, take on large numbers, and do what they know to be poor work under sweated-labor conditions. These sweated-labor conditions turn out in actuality to be a test of physical endurance. They make no allowance for the not-so-young doctor, nor for those of exceptional experience and capability. The future is indeed grim, except for the head-hunters. The complacent pomposity of the B.M.A. in saying doctors

must make the Service a success is infuriating, because the better the doctors do their work the worse their pay."

This additional letter from the British Medical Journal of August 28 under the title "Free Bottles" reveals another of the many ridiculous aspects of the British plan.

"Sir,—Under the National Health Scheme bottles and containers are supplied free. The chemist is paid 2½d. a bottle. Suppose the average number of bottles prescribed per doctor per day for six days a week is twenty, and if 30,000 doctors join the Service, then the annual cost is 1,950,000 pounds. The weekly reward to a doctor for his services per patient is only slightly more than the cost of an empty medicine bottle. Perhaps later on kind Mr. Bevan might award us an addition to our pay equal to the cost of one more empty bottle a week?—I am, etc., T. A. Weston."

The following over-all viewpoint from Cyril Osborne, conservative member of Parliament, is significant in that it shows the idle complacency of the socialite rule.[3] He urges Britons to "Cease this mad chase after pleasure and get down to work."

After warning that otherwise they may go hungry soon, he adds, "Last year this country did not earn its bread, cereals, meat or bacon and we ate these basic foods as charity from the American workers and taxpayers. This charity will dry up as soon as Stalin becomes friendly and war with Russia less likely."

After discussing the shocking conditions in New Zealand the following estimate for the U. S. is given in this brief statement:[4]

"Dr. E. L. Henderson of Louisville, who returned not long ago from his third European trip in 14 months as a representative of U. S. medical groups, reported that socialized medicine has resulted in a marked decline in standards or medical care. He said that if members of Congress could see how these systems work, they would resist any effort to impose compulsory health systems on the United States.

"Dr. A. L. Jones, an oral surgeon of Christchurch, New Zealand, gave even more recent testimony to the same effect in an address to a Chicago conference of professional men sponsored by the National Physicians Committee.

". . . Based on this experience, the United States, with a similar system, probably would have to provide facilities for some 17,000,000 individuals as a permanent hospital population."

The A.M.A. report on hospital service in the United States shows a total bed capacity for the citizenry of the United States today as 1,425,222. Multiplying this figure by 12 gives approximately 17,000,000. Multiplying this by the present per diem cost of V.A. hospitalization gives an approximate cost of 32 billion. Add to this figure on hospitalization two or three times the cost of present medical service as given at present and a stupendous figure emerges. Look as it and despair.

There is not a genuine need for so many beds. The New Zealand experience shows they must be provided to meet the false demand created by a vicious paternalism. People are so constituted that when they give up their money with no hope of returns except through sickness, many of them find it easy to fall ill. Though it may be difficult to find a doctor who will agree, it is easy to go from one to another since the service is provided by the government and nobody but God and the doctor knows they are not sick and nobody but the patient and God knows how many doctors he has seen. At the cost of honor and integrity certification may be achieved and before the deadline is reached the hospital bed is occupied and the spurious patient is recovering his money's worth through a well attended bed rest. A government inspired distortion of conscience makes this subterfuge seem justifiable and brings a regrettable sense of false satisfaction.

Recently the 20th century king and queen trotted to Parliament to give it the swiftest opening ever recorded. The time saved will be needed to work out the wild dreams of a socialistic government and to negotiate its economy under the curtailed production of its soldiering labor organizations. It takes money to successfully lower educational standards and achievement by subsidizing all who enter Oxford and other similar schools. What will be the result of the leveling process; who will arise from the low intellectual plateau to lead the empire? If such a possible leader should arise would the representatives of socialism knock him down to the drab level which knows no peaks. Amiel foresaw this a hundred years ago and sounded the alarm. America, literally the land of the free, should listen and learn.

1. C. S. Bluemel, *War, Politics and Insanity* (Denver: The World Press,) 1948. (Reviewed elsewhere in the Journal).

2. Humphrey Foxell, "Head Hunters," *British Medical Journal* (August 21) 1948. p. 90.

3. *The Daily Oklahoman* (September 14) 1948.

4. Wilbur J. Brons, "State Medicine Everywhere Proves Bad Medicine," *Chicago Journal of Commerce* (September 10) 1948.

SCIENTIFIC ARTICLES

BASIC PRE AND POST-OPERATIVE TREATMENT FOR CANCER OF THE COLON*

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More and more physicians have come to realize that the only hope of curing malignancy of the bowel is by radical operative excision of the lesion and of the gland-bearing tissues in continuity with the lymphatics of the involved area. Any operation of this nature must be radical to be successful; and if it is to be radical the patient must be adequately prepared to withstand it.

Any operation for cancer of the colon or rectum is an operation of the first magnitude even when the patient is in good physical condition. Unfortunately the patient who has cancer of the colon also is often the victim of a train of complications due to the lesion itself. The best way to treat complications of surgery of the large bowel is to forestall them, and it is with this thought in mind that the following notes are offered.

The six critical factors are: waterbalance, acid-base balance, nitrogen balance, anemia, anti-bacterial control and vitamin balance. There is no order of importance implied in this list; in fact most of these factors merge one into the other and are divided arbitrarily for the purpose of convenience in discussing them. Thus, even the strictest attention being given to any five of them, neglect of the sixth may be just as catastrophic as if all had been ignored. Vigilant control of all six will assure operability to the vast majority of patients and will offer at least a fighting chance for survival to that small group of patients who under other circumstances are doomed to certain death.

I. WATER-BALANCE

Pre-operative: During this phase waterbalance is usually near equilibrium although the advanced case whose food intake has been poor and who has lost considerable weight demands careful consideration as to the water requirements of his tissues. The important factor to be determined is the ability of the kidneys to maintain their function adequately following the strain of extensive surgery. At least 500 cc. of urine are required daily for *normal* kidneys to concentrate to a specific gravity of 1.030. To excrete the same amount of waste solids kidneys of low concentrating capacity require at least 1500 cc. This has been established by Maddock and Coller[3] to be the *minimal* quantity of daily urine output. There have been attempts to provide simple inexpensive clinical tests to determine the status of water balance. Notable among these has been the McClure-Aldrich test of tissue hydration[4,5]. More reliable criteria for evaluating the functional state of the kidneys are the serial urea clearance determinations[6] and blood NPN or urea-nitrogen. A word of warning here—many physicians consider renal function to be normal if the blood NPN is reported within normal limits. This value becomes elevated only after complete break down of kidney reserve[7]. A urinary output of 1500 cc with a specific gravity of 1.015 or above, can usually be maintained by an intake of 3000 to 3500 cc daily by mouth. The nature of the fluid is controlled by the desires of the patient. An intake and output chart should be initiated at this time.

Post-Operative: The intake--output chart is continued and the nursing staff must be impressed with the importance of an accurate, and *complete* record. A frequent error is to fail to include the amount of fluid drained by Wangensteen suction if that apparatus is being used. A total intake of from 2000 to 3000 cc. or more is given daily. If an insufficient amount of sodium chloride is given with this fluid a diuresis may follow and unless the electrolyte is replaced the patient will become markedly dehydrated in a few days despite the large fluid intake. Factors other than the output chart, in determining the volume to be given are comparison between post-operative and pre-operative blood studies, gastro-intestinal drainage, and urine concentration. The nature of the fluid to be administered is de-

termined by study of other factors as will be outlined later.

II. ACID-BASE BALANCE

Pre-Operative: For all practical purposes the keystone of acid-base balance is sodium chloride metabolism. While under normal circumstances the chloride level remains fairly constant, in patients who suffer chronic debilitating disease, such as carcinoma of the colon, and particularly if the lestion is of an obstructive nature, any marked degree of loss in the extra-cellular level of base and water results in a fall of the total base concentration both in the plasma and within the cell itself. Approximately 90 per cent of the base in the extracellular fluid is composed of the sodium ion. In order to avoid either acidosis or alkalosis, the chloride level and total serum carbon dioxide content must be known. In addition the hematocrit level should be determined simultaneously. No surgery is permissable until the chloride level, and synchronously, the carbon dioxide combining power of the serum has been brought to within normal limits. It is preferable to permit this normal level to become stabilized for two to three days before surgery in elective cases. Isotonic saline with 5 per cent glucose is the usual choice of replacement fluid, but for emergency use, particularly in the case of the obstructed alkalotic individual, hypertonic saline solutions, up to the level of 5 per cent may be of life-saving importance. In the presence of hypo-proteinemia, however, such solutions should be preceded by large infusions of plasma or whole blood to avoid the hazard of an acute pulmonary edema. It has been sugested that three fourths of the total base required be administered as isotonic saline solution and the remainder in the form of sodium lactate[8]. If drainage through the indwelling intestinal tube is being used additional saline must be provided to allow for such electrolyte loss. Wangensteen has suggested as a good working rule to estimate the sodium chloride loss as five grams per liter of gastric fluid aspirated. No rule or formula for estimating the quantities of chloride needed can be consistently relied upon. There is no substitute for often repeated chloride and carbon dioxide combining power determinations.

Post-Operative: It is during this phase that the electrolyte status of the patient is most difficult to maintain. He has had a prolonged anesthesia, which has been shown to cause a certain degree of salt intolerance, and he may be subjected to electrolyte loss by way of duodenal suction and peritoneal drainage in addition to his normal losses due to perspiration and urination. It is imperative to replace lost electrolytes promptly if alkalosis is to be avoided. Here again so-called "routine I. V.'s" cannot safely bridge the gap. The blood chloride level and the carbon dioxide combining power must be determined daily—and quantitative and qualitative intravenous medications must be computed accordingly. In the presence of hypo-proteinemia, oliguria or acidosis, particularly after general anesthesia, isotonic sodium chloride must be given with some caution to avoid the risk of pulmonary edema. Coller has suggested that hypotonic sodium chloride (0.5 per cent in 5.0 per cent glucose) be given during the first two post-operative days.

III. NITROGEN BALANCE

Pre-Operative: For many years it has been known that in malignancy there is a decreased protein level. Numerous causes for the low serum protein levels in patients with carcinoma of the gastro-intestinal tract have been suggested. Among these are functional impairment of the liver[9], continual or intermittent bleeding[10], depletion of protein stores due to deficient diet[11], inability to absorb adequate amounts of the essential amino acids[10] and failure of adequate serum protein synthesis[12]. 29.3 per cent of Mayer and Kozolls patient with gastro-intestinal cancer had average protein values below 6.0 Grams per 100 cc. Bacon *et al* report 29.7 per cent of their patients with colonic cancer showed varying degrees of hypo-proteinemia upon admission to the hospital[13]. A routine pre-operative plasma protein test must be taken. Hypo-proteinemia is present if the protein level is at or below 6.5 Grams per cent. Higher levels are desirable.

The best route for protein administration is by oral food intake[2] but often the cancer patient is unable to either ingest or assimilate an adequate amount of proteins. Parenteral administration of blood plasma, and plasma substitutes, then becomes necessary to bring the nitrogen balance up to normal and hold it there. Prior to the recent war whole blood was the usual means by which protein was served to the organism and it still occupies a pre-eminent status in correcting hypo-proteinemia although plasma and hydrolyzed protein have been winning a place for themselves due to the experience gained in their use by the military. Elman[14], points out that "the thera-

peutic value of blood transfusions resides largely in their protein content which, of course, occurs in at least two forms: (1) as hemoglobin within the red blood cells, and (2) as the various plasma protein fractions, particularly albumin." Allen *et al*[15] believe that the fear of over-transfusion is unwarranted except in the presence of a diminished cardiovascular reserve. In support of this contention they cite the example of a patient who was given 7,200 cc. of whole blood in 11 days. Despite a draining subdiaphragmatic abscess he was in positive nitrogen balance continuously. An unexpected finding in this particular case was that there was no appreciable increase in total circulating blood or in plasma protein concentration during the first 6 days during which the patient received 5200 cc. of blood. During this same time the patient's blood volume failed to show any appreciable change from the initial pre-transfusion level. They postulate that possibly some of this blood was held extravascularly as tissue protein. They state that "the term "hypoproteinemia" probably should not be limited to lowered plasma proteins, but should apply to deficits in hemoglobin as well," since, as they point out, hemoglobin constitutes approximately two-thirds of the blood protein, and a markedly reduced whole blood protein level can be present in an individual with a normal plasma protein if he is markedly anemic.

The value of plasma is disputed by some workers[16], however this belief is probably due to the fact that most of those surgeons who decry the use of plasma have administered it in quantities too small to cause any appreciable elevation in the plasma protein concentration. If plasma is used it must be given in large quantities, 1500 cubic centimeters, or more, daily, for several days. The author has administered to severely hypoproteinemic soldier patients, as much as 4400 cubic centimeters in 24 hours using the Scannell apparatus, and with a good plasma protein response. Holman, Mahoney and Wipple[17] were able to maintain a positive nitrogen balance, in dogs on a nitrogen-free diet, by intravenous administration of plasma.

In recent years there have been developed preparations of amino acid solutions and hydrolyzed or digested proteins suitable for parenteral use. These solutions are adjusted and fortified to yield all of the essential amino acids necessary for normal protein synthesis. They are relatively inexpensive and it has been demonstrated by numerous workers that humans and animals can be maintained in positive nitrogen balance by administration of these synthetics as the sole source of nitrogen ([18-19-20-21]). Glucose solution should be given with the protein infusions because the addition of carbohydrate to the amino acid mixture spares the protein and permits more of it to be used by the body for tissue protein synthesis. Fifteen to 20 grams of protein hydrolysate per hour is a satisfactory rate of administration for the average patient. From 60 to 90 grams in 24 hours is required to maintain positive nitrogen balance. Administration of these preparations is guided by the same indications and precautions as for normal plasma, keeping in mind that harmful reactions have occurred following the parenteral administration of these proteins just as they have following injections of plasma.

About 5 per cent of patients react to the intravenous administration of amino acid preparations. These reactions are; nausea, abdominal cramping, sudden elevation of the temperature, and urticarial rashes. The frequency of these reactions can be held to a minimum by adjusting the speed of infusion to no more than perhaps 300 cc. per hour, or by simultaneously injecting 5 per cent glucose solution through the same needle. If it is anticipated that amino acids will be given over long periods of time the most distal veins should be used first because phlebothrombosis at the site of injection very frequently follows prolonged administration. Later injections may be given at successively proximal points in the same vein.

Post-Operative: Parenteral protein administration assumes even greater importance here than it did prior to operation. Often the patient is unable, or is not permitted to ingest and assimilate protein by mouth, consequently he suffers a rapid loss of plasma protein. The systemic effect of this loss is a reduction in blood volume and as a result, the venous return is lessened, the cardiac output is reduced and shock supervenes. A less immediate result is delayed and abnormal wound healing jeopardizing the anastomosis of the bowel. Koster and Shapiro[22] and others[23 24] have shown that hypoproteinemia is a predominant factor in the faulty wound healing that eventuates in disruption.

The same general principles should be followed post-operatively as were prior to

surgery. The indices are daily protein *and* hematocrit levels. The plasma protein level alone is not reliable unless an index of plasma volume also is available. The one other point to be kept in mind is that *neither plasma nor amino acid solutions are more than temporary and partial substitutes for whole blood replacement in shock due to blood loss.*

IV. ANEMIA

Pre-operative: As is well known, one of the most constant laboratory findings in cancer of the colon is anemia; often it is the only symptom in carcinoma of the right colon. Gross[25] has observed a direct destruction of erythrocytes by specific hemolysins formed, or liberated, by cancer cells of that species. He concludes that strain-specific carcinoma hemolysins are at least a partial explanation of the frequent development of anemia in patients with cancer. No patient should be required to undergo major definitive colon surgery unless his blood count is at the level of 4,500,000 RBC per cubic mm., or higher, irrespective of the number of blood transfusions necessary to bring it up to this level. An additional liter of whole blood should be available for administration during, and just following the operation.

Post-operative: During the immediate post-operative phase the blood pressure is the index of blood transfusion, rather than the blood count. Blood should be liberally administered during the first 24 hours for a two-fold purpose, (1) to combat shock, and (2) to provide protein, each 500 cubic centimeters of whole blood providing about 19 grams of utilizable protein. After the first post-operative day blood is seldom needed if it has been adequately administered previously.

V. ANTI-BACTERIAL CONTROL

Pemberton, Black and Maino, of the Mayo Clinic, have stated[26] that the improvement in the results of colon surgery since the introduction of sulfonamides, streptomycin and penicillin, is as striking as the changes produced by the use of iodine in the surgery of the thyroid gland. Before the introduction of chemotherapy in their clinic the mortality following colostomy was 5.1 per cent. Since routine chemotherapy was adopted in 1942 the mortality from colostomy has dropped to 1.1 per cent. This experience has been amply confirmed by many others[27 28 29 30 31 32 33].

Poth and his associates have shown that succinyl - sulfathiazole (Sulfasuxidine) is sparingly absorbed from the bowel; the blood level of free sulfathiazole rarely going above 1.5 milligrams per cent in patients taking the suggested dose of .25 grams per kilogram of weight in six divided doses per 24 hours. Pthalylsulfathiazole (Sulfathalidine) has the same characteristic. The latter drug is twice as potent as the former so is usually given in amounts of 0.1 gram per kilogram of body weight every four hours. Either drug must be begun at least seven days pre-operatively. Poth, Ross and Fernandez[34], working on dogs showed that when sulfathalidine had been given before and after laparotomy, the inflamation resulting from spillage of intestinal fluid in open anastomosis subsides and normal tissue healing progresses. No dog died when the drug was used; 43 per cent of their controls succumbed.

As a group, the sulfonamides are believed to produce their characteristic effects on bacteria by interfering with their metabolism in the so-called "logarithmic" or most rapid phase of bacterial growth. O'Meara *et al*[35] have shown that this action within the bacterial cells is by a neutralizing combination of the sulfones with gluco-reductone. This substance is a source of cell growth energy. Sulfonamides, by combining with gluco-reductone deny it to the bacterial cell and the entire cellular mechanism is suddenly stopped at the very point where it has become developed for the purpose of reproduction.

Poth[36] and Angelo[33] list the advantages of sulfathalidine as: (1) A more rapid action on E. coli and the vegetative forms of clostridia; (2) It does not cause watery stools; (3) It is effective in the presence of diarrhea; (4) It is non-toxic; (5) It is twice as potent as sulfasuxidine.

The tendency for sulfasuxidine to cause thin stools can occasionally be used to great advantage in the preparation for surgery of the patient with a partial obstruction of the bowel. Frequently it will be found that the obstruction will be almost completely relieved due to the liquifaction of the feces and the subsidence of the edema due to secondary bacterial invasion of the tumor mass.

Aside from occasional minor drug sensitivities the most important deleterious effect of the sulfonamides is that they diminish the naturally occuring vitamins by lessening the bacterial action which produces them. This factor will be more fully discussed in a following section.

Streptomycin has a potent action on many gram-negative as well as gram-positive bacteria[31 37]. Among these is streptococcus fecalis which is ordinarily resistant to other drugs. Escherichia coli and the paracolon bacilli are also sensitive to this drug. Streptomycin provides a high concentration in the intestinal tract, if given orally, because there is no destruction of the drug, hence it is almost completely excreted in the feces. It is tasteless and odorless so may be given dissolved in water in doses of one gram every eight hours beginning on the second or third preoperative day. E. coli develops a tolerance to streptomycin in three or four days so prolonged administration is not advisable. Crowley *et al*[38] have found, in the case of urinary tract infections at least, that combined streptomycin-sulfasuxidine therapy is much more efficacious against resistant coliform bacteria than is either of the drugs when used alone. Serious toxic effects are rarely encountered. The most frequent reactions are headache, skin rashes or urticaria, fever, facial anesthesia and joint pains. These reactions are usually mild and disappear promptly following cessation of use of the drug. Involvement of the vestibular portion of the eighth nerve is not to be feared because of the route of administration and the limited amount of drug used.

Penicillin has no effect on gram-negative organisms, with the exception of the neisseria group. It is usually given in amounts of 25 to 50 thousand units every three hours intramuscularly. Dixon, of the Mayo Clinic, routinely dusts into the peritoneal cavity a powder consisting of 100,000 units of dry penicillin mixed with 10 grams of sterile sulfathiazole[39].

Poth[45] and his colleagues at the University of Texas discovered that there is an *antagonism* of action between penicillin and sulfathalidine. They found that when these two drugs were given at the same time the gram positive organisms were *not* affected and furthermore that the coliform organisms *increased* rapidly. They conclude that penicillin and sulfathalidine should not be given simultaneously.

Post-operative: As soon as the patient is able to retain fluids the calculated dosages of sulfathalidine should be resumed, being administered in a suspension with water or milk. If sulfasuxidine had been used prior to surgery it may be replaced by sulfathalidine for the reasons which have been previously listed. Administration of the drug should be continued for eight to 10 days until sealing off of the line of anastamosis is complete.

Streptomycin and penicillin, if desired, can be continued, but because E. coli rapidly becomes resistant to the former drug it should be discontinued after three or four days.

VI. VITAMIN BALANCE

Pre-operative: It is well accepted now that there is a high incidence of hypovitaminosis in patients who have cancer. This alteration in vitamin metabolism parallels the changes in nitrogen metabolism but the cause for the deficiency is not understood. Keifer believes that the vitamin B complex is perhaps the key factor. He says[40] "Vitamin deficiencies, particularly those involving the vitamin B complex group of vitamins can profoundly impair digestion and absorption of essential food elements. Since malabsorption further diminishes the subject's vitamin intake, a vicious circle is established." Golden[41 42] has suggested that the intramural nervous system is the most probable medium through which nutritional deficiency affects the intestinal tract. Torda and Wolff[43] have demonstrated that when cholinergic nerves are stimulated they liberate both acetylcholine and thiamine and that the latter increases the effect of acetylcholine on the intestine and circulatory apparatus of the cat. Chemically these two compounds are closely related, therefore it is reasonable to believe that they may have a synergistic function. These facts furnish a reasonable explanation of the mechanism of paralytic ileus in the presence of thiamine deficiency and of the favorable response to administration of large doses of thiamine chloride. Leithauser[44] reported a series of cases of adynamic ileus with marked abdominal distention, which failed to respond to mechnical decompression and drugs, but which were promptly cured by administration of the vitamin B complex. He states "It is now my practice to administer parenterally vitaimn B complex, with high thiamine content to all surgical patients the day before operation, and daily for three days after surgery. Since this has been done, post-operative distention has been almost entirely eliminated." Ravdin and Zintel and a host of other writers confirm the need for supplemental vitamin intake. The principal needs are; ascorbic acid; thiamine, riboflavin, and nicotinamide of the B complex; and vitamin K. They may be given orally in the form of one of the

multivitamin preparations but to assure absorption the parenteral route is probably best. It is suggested that heavy dosage be given, for example .5 to one gram of ascorbic acid, from 10 to 30 mgm each of thiamine and riboflavin, from 200 to 300 mgm of nicotinamide, and five mgm of vitamin K be given daily beginning three or four days prior to operation. A convenient way to administer all of the above (except the vitamin K) is to add the entire contents of an ampule of Solu-B with vitamin C (Upjohn) to the glucose solution just prior to its administration.

Post-operative: Parenteral administration of vitamins should be continued in the amounts indicated above until the patient has begun to take a general diet. After this time he should receive any of the various multiple vitamin preparations orally three times daily throughout his convalescent period.

CONCLUSION

Revolutionary changes have been made in the surgical management of colon cancer in the past 15 years. These have come about because of the advent of chemotherapeutics and because more careful consideration is given to the physiologic and chemical imbalances which are almost always present in patients with carcinoma of the large bowel. Careful individualized attention to these factors has resulted in a greatly increased operability rate (as high as 96 per cent being reported in one series of 250 cases.[1]) and in greatly lowered mortality and morbidity rates.

The writer has attempted to stress the basic facts supporting each of the six major factors presented, and has deliberately avoided presentation of a "routine set of orders." Every cancer patient is an individual chemical and physiological problem. It can be only by the application of basic principles guided by adequate use of the proper laboratory studies that this patient will be assured of every possible chance of being cured. The least of us deserves nothing less than that.

BIBLIOGRAPHY

1. Babcock, W. W. and Bacon, H. E.: Complications in the Surgical Treatment of Carcinoma of the Large Bowel. J.A.M.A., 128:10, (May 12) 1945.
2. Ravdin, I. S.: Some Problems in Protein Deficiency. Connecticut M. J., 11:7, 1947.
3. Maddock, W. E. and Coller, F. A.: Water Balance in Surgery. J.A.M.A., 108:1, 1937.
4. McClure, W. B. and Aldrich, C. A.: Time Required for Disappearance of Intradermally Injected Salt Solution. J.A.M.A., 81:293, 1923.
5. Kunde, M.: Correlation of Elastometer Fndings, Disappearance Time for Intradermally Injected Salt Solution, Urinalysis and Nitrogen Retention of Blood in Edema. Arch. Int. Med., 38:57, 1936.
6. Van Slyke, D. D.: Urea Clearance As a Measure of Renal Function. Am. J. M. Technol., 2:42, 1936.
7. Schmidt, C. R. and Chesky, V. E.: Clinical Studies of Liver Function. Am. J. Surg., 75:773, (June) 1948.
8. Elkinton, J. R., Gilmour, M. T. and Wolff, W. A.: The Control of Water and Electrolyte Balance in Surgical Patients. Ann. Surg., 110:1050, 1939.
9. Abels, J. C., Rekers, P. E., Binkley, G. E., Pack, G. T. and Rhoads, C. P.: Metabolic Studies in Patients with Cancer of the Gastro-Intestinal Tract. Hepatic Dysfunction. Ann. Int. Med., 16:221, 1942.
10. Abels, J. C., Ariel, I., Rekers, P. E., Pack, G. T. and Rhoads, C. P.: Metabolic Abnormalities in Patients with Cancer of the Gastro-Intestinal Tract. Arch. Surg., 46:844, 1943.
11. Ariel, I., Pack, G. T., and Rhoads, C. P.: Metabolic Studies of Patients with Cancer of the Gastro-Intestinal Tract. Ann. Surg., 116:924, 1942.
12. Madden, S. C. and Whipple, A. H.: Plasma Proteins; Their Source, Producation and Utilization. Physiol. Rev., 20: 194, 1940.
13. Bacon, H. E., Todhunter, W. D., Gass, O. C. and Wolfe, F. D.: Pre-operative and Post-operative Treatment of Cancer of the Rectum and Pelvic Colon. J. Internat. Coll. Surg., 8:29, 1945.
14. Elman, R.: Editorial, Surg., Gyn., Obst., 85:113, 1947.
15. Allen, J. G., Bogardus, G., Egner, W. and Phemister, D. B.: Correction of Hypoproteinemia by the Administration of Plasma and Blood. Surg., Gyn. Obst., 86:604, 1948.
16. Hayword, G. W. and Jordan, A.: Changes in Blood Volume Following Transfusions of Blood or Plasma and Fate of Injected Protein. Brit. M. J., 50:462, 1942.
17. Holman, R. L., Mahoney, E. B. and Whipple, G. H.: Blood Plasma Protein Given by Vein Utilized in Body Metabolism. J. Exp. M., 59:269, 1934.
18. Madden, S. C., Anderson, F. W., Donovan, J. C. and Whipple, G. H.: Plasma Protein Production Influenced by Amino Acid Mixtures and Lack of Essential Amino Acids. J. Exp. M., 82:77, 1945.
19. Madden, S. C., Carter, J. R., Kattus, A. A., Jr., Miller, L. L. and Whipple, G. H.: Ten Amino Acids Essential for Plasma Protein Production Effective Orally and Intravenously. J. Exp. M., 77:277, 1943.
20. Rose, W. C., Haines, W. J., Johnson, J. E. and Warner, D. T.: Further Experiments on the Role of Amino Acids in Human Nutrition. J. Biol. Chem., 148:457, 1943.
21. Rose, W. C. and Rice, E. E.: Significance of Amino Acids in Canine Nutrition. Science, 90:186, 1939.
22. Koster, H. and Shapiro, A.: Serum Proteins and Wound Healing. Arch. Surg., 41:723, 1940.
23. Koster, H. and Kasman, L. P.: Relation of Serum Protein to Well Healed and to Disrupted Wounds. Arch. Surg., 45:776, 1942.
24. Localio, S. A., Chassin, J. and Hinton, J. W.: Tissue Protein Depletion. Surg. Gyn. Obst., 86:107, 1948.
25. Gross, L.: Hemolytic Action of Mouse Mammary Carcinoma Filtrate on Mouse Erythrocytes in Vitro. Proc. Soc. Exp. Biol. & Med., 65:292, 1947.
26. Pemberton, J. deJ., Black, B. M. and Maino, C. R.: Progress in the Surgical Management of Diverticulitis of the Sigmoid Colon. Surg. Gyn. & Obst., 85:523, 1947.
27. Richards, V.: Sulfonamides in Surgery. Surgery, 14: 308, 1943.
28. Cunningham, T. D.: The Sulphonamides. Rocky Mt. M. J., 40:178, 1943.
29. Behrend, M.: Succinylsulfathiazole and the Elimination of the Mikulicz Operation. Surg. Clin. N. Am., (Feb.) 1944, p. 238.
30. Archer, H. L. and Lohman, E. P.: Clinical and Laboratory Experiences with Succinylsulfathiazole. Ann. Surg., 119: 518, 1944.
31. Pulaski, E. J.: Streptomycin. Am. J. Surg., 73:651, 1947.
32. Ravdin, J. S., Zintel, H. A. and Bender, D. H.: Adjuvants to Surgical Therapy in Large Bowel Malignancy. Ann. Surg., 126:439, 1947.
33. Angelo, G.; Pthalylsulfathiazole, "Sulfathalidine,": A Clinical Evaluation in 122 Patients with Proctologic and Related Conditions. Am. J. Surg., 70:354, 1945.
34. Poth, E. J., Ross, C. A. and Fernandez, E. B.: An Experimental Evaluation of Sulfasuxidine and Sulfathalidine in Surgery of the Colon. Surgery, 18:529, 1945.
35. O'Meara, R. A. Q., McNally, P. A. and Nelson, H. G.: The Intracellular Mode of Action of the Sulfonamide Derivatives. Lancet, 2:747, 1947.
36. Poth, E. J.: Succinylsulfathiazole and Pthalylsulfathiazole in Surgery of the Colon. Surgery, 17:773, 1945.
37. Waksman, S. A. and Schatz, A.: Streptomycin—Origin, Nature and Properties. J. Am. Pharm. Assn., 34:273, 1945.
38. Crowley, E. and O'Conor, V. J.: Treatment of Persistent Colon Bacillus Infections of the Urinary Tract by Sulfasuxidine and Streptomycin. Surg. Gyn. & Obst., 86:224, 1948.
39. Dixon, C. F.: Personal communication.
40. Kiefer, E. D.: Small Intestine: Review of Recent Literature. Gastroenterology, 5:259, 1945.
41. Golden, R.: Small Intestine in Vitamin B Deficiency. J.A.M.A., 117:913, 1941.
42. Idem: Abnormalities of Small Intestine in Nutritional Disturbances. Radiology, 36:262, 1941.
43. Torda, C. and Wolff, H. G.: Effect of Vitamin B-1 and Cocarboxylase on Synthesis of Acetylcholine. Proc. Soc Exp. Biol., 56:89. 1944.
44. Leithauser, D. J.: Atypical Adynamic Ileus Apparently Caused by Nutritional (Thiamine Chloride) Deficiency. Surg. Gyn. Obst., 86:543, 1948.
45. Poth, E. J., Wise, R. I. and Slattery, M. P.: Penicillin-Phtalylsulfathiazole Anatagonism. Surg., 20:147, 1946.

RINGWORM OF THE SCALP: TREATMENT BY X-RAY EPILATION*

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In the past few years an epidemic of ringworm of the scalp has occurred in widely separated parts of the United States, especially in the larger cities of the east and north and recent experiences suggest that the incidence of the disease in Oklahoma has increased rapidly. A disturbing feature of the epidemic has been the reported rise in the percentage of cases resistant to ordinary treatment measures. In these cases the disease does not respond to the usual simple remedies but continues for the most part unchecked until the hair is epilated with x-rays. Several instances of this sort seen recently have led me to think that tinea capitis of a more resistant type is invading Oklahoma and that treatment by x-ray epilation may become more necessary here than it has been in the past.

CAUSE

Ringworm of the scalp is caused by an invasion of the skin and hair, including the hair root, by any of several species of fungi. Two of these, *microsporum audouini* and *microsporum lanosum* have been reported as being most common in the United States. In times past, to judge from reports, infections with *microsporum lanosum* were more numerous than those caused by *microsporum audouini*, but in the epidemic of recent years this order has been reversed and it now appears that infection with *miscrosporum audouini* has become a good deal the more common of the two—in the experience of one group, accounting for 96 per cent of all cases. This is of importance, since experience indicates that treatment of infections with miscrosporum audouini is unsatisfactory except by x-ray epilation.

IMMUNITY

The disease occurs mainly in children of 10 or 11 years and younger, though a few cases occur up to puberty. I have never observed one in a grown person and extremely few have been reported. Evidently as puberty is approached an immunity to the disease develops. It is interesting that although the adult scalp is immune, the bearded area is not, since ringworm of the beard is of occasional occurrence. Tinea capitis is seen about four times as often in boys as in girls but it is doubtful if this due to a true predilection. The difference in the incidence in the two sexes could be accounted for by the greater activity and consequently greater exposure of boys to the infection. As in other diseases there appears to be a difference in the immunity reactions in different patients. I recall an instance, observed several years ago, that seemed to be a good example of this. Two boys about eight years old were given the same type of treatment for ringworm of the scalp. These patients, who were dissimilar twins, lived together in the same house and in all probability had acquired the disease from the same source. One of them appeared to handle his infection without much difficulty—a few small abcesses cleared promptly under treatment and the patient was never ill. His brother on the other hand, had little resistance—the abcesses on his head were so large and numerous that the entire scalp appeared to have been lifted above the skull by the underlying pus. This was before the time of x-ray epilation and the patient was a very sick boy for months.

DIAGNOSIS

A trained observer usually can make the diagnosis of tinea capitis by inspection alone but at times it is necessary to resort to further procedure. A recent development is the use of the "Wood filter" for short ultraviolet rays. These rays cause the hairs of an infected area to fluoresce, reflecting a greenish light. Examination with the "Wood light" is quick and generally satisfactory but unless it is made under proper conditions confusion can arise from the fluorescence of drugs, ointments and other contaminants on the hair. For that reason the scalp must be carefully washed before any dependence can be placed on this type

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of examination. A more positive diagnosis can be made by finding the fungus in the hair roots under the microscope, or by taking cultures, which are necessary in any case to differentiate the various micro-organisms that cause the disease. Cultures are a valuable aid in treatment but if depended on as a guide, have the disadvantage of interposing a delay of four weeks required for their completion before treatment can be decided on. Clinically ringworm of the scalp can be confused with eczema, impetigo and alopecia areata. A demonstration of the fungus microscopically or by culture furnishes the only positive diagnosis.

SPREAD OF THE DISEASE

Ringworm of the scalp is acquired and spread by contact with contaminated material, especially hairs and epithelium, barbers' instruments, clothing, caps, pillows, furniture, combs, brushes and other things with which the patient comes into contact, such as sofas and theatre seats. Infection with *microsporum aduouini* is essentially limited to man but *microsporum lanosum* affects animals as well. For that reason *microsporum lanosum* is often acquired from pets, mainly kittens and puppies and occasionally calves. Both of these types of organisms are transmitted directly from person to person.

TREATMENT

Treatment varies considerably with different persons and apparently with different fungi. It seems pretty well agreed that infection with microsporum lanosum is easily cured by topical applications, while that caused by microsporum audouini is very resistant to such measures. I am unable to say from personal experience whether this is uniformly true but at any rate, in years past most cases of ringworm of the scalp occurring in this region have been curable by simple means. In some cases, however, the time required for cure is so great that the treatment becomes a tedious thing for both patient and the person who does the treating. In such cases and in all infections caused by microsporum audouini, treatment by removing the scalp hair with x-rays is welcomed by all concerned, since in a great majority, this treatment results in cure within a few weeks after the hair falls. Of course, x-ray epilation must be carried out only by one having the necessary training and experience, for if improperly done, permanent alopecia may result. When it is properly carried out, however, this method can be quite safe, as indicated by the experience in certain large centers in the east, especially New York, where thousands of consecutive cases have been treated in this way without a single instance of permanent alopecia resulting. I have myself used this method with complete satisfaction in selected cases for more than 15 years and in none has there been permanent loss of hair. In every case, cure of the ringworm has been effected within a short time after epilation.

Fig. 1. Showing the approximate location of the points on the scalp at which the beam of radiation is directed at the different exposures. The fifth point is above the ear on the opposite side of the head. Overlapping of the various treatment areas can be seen.

TECHNIC

Epilation can be carried out by various technics. In all of these the radiation is delivered to the scalp by directing the center of the beam to several points, allowing the radiation to overlap in varying degrees in the different areas treated. The method I have used and the one most commonly employed is one originally described by Adamson and Kienbock and called after these men. It consists in directing the beam of x-rays to five different points on the scalp, as shown in the diagram. It is advisable, though not necessary, to have the hair of the scalp clipped short before epilation in order to facilitate marking of the scalp and to increase the accuracy of the irradiation. The points at which the x-rays

are to be centered are most easily and accurately located with a "tinea marker," which can be made from a narrow flexible steel tape measure. Such a marker is made by forming a circular band 20 inches in circumference and attaching to it at right angles two semicircular bands, the ends of which are attached to the circular base band at a distance of five inches from each other. The semicircular bands cross at the top and are riveted in the midline, forming a helmet-like arrangement. This marker will not fit all heads exactly but will in any case serve as a preliminary measuring device to fix a base point and furnish symmetry to the eventual marking of the scalp. The marker is fitted over the patient's head so that the point of intersection of the two cross pieces on top will rest approximately over the vertex of the skull, with the base band encircling the head near the margins of the scalp like a cap. The ends of the cross pieces of the marker then locate four other points on the scalp, the first one exactly in the midline, about an inch and a half behind the hair-line in front, another in the midline about two inches above the scalp margin on the occiput and two others, each about an inch above the ear on opposite sides of the head. The scalp is then marked with a skin pencil, making sure that the points are symmetrically located, exactly five inches apart and the marker is removed.

Fig. 2. The tinea marker in position on the head.

The details of irradiating the scalp for epilation can be obtained from any of several good text books dealing with the subject and I will not repeat them all here. Several points are important however. Probably the most important of these is that the center of the beam of radiation must be directed exactly at each point marked on the scalp and at each exposure must be at right angles to that used in treating all other areas except the one directly opposite it on the skull. The child's head must be held perfectly still during the whole exposure, since any motion would cause an irregular overlapping of the irradiated areas, with possible permanent alopecia. The child may be a little excited and unruly at first but when he finds there is no pain or discomfort associated with the treatment, he will usually cooperate well. Another important consideration is the distance between the scalp and the target of the x-ray tube. The distance usually employed is eight inches and in general this is best but I have found in irradiating heads larger than average that a distance of 8¾ inches (making proper allowance for the effect of this increased distance in the dosage) will yield a more uniform epilation. During each exposure, the operator must be careful to shield the face and especially the ears, which might otherwise be subjected to an overdose from repeated exposures.

The dosage necessary to cause epilation by the method described will in most cases be close to 300r unfiltered, using 80kv but there is a considerable variation in the amount necessary in different patients. It goes without saying that the machine used must be accurately calibrated.

In most cases in which epilation is indicated it is best to epilate the entire scalp. When there is only a small patch of ringworm it is a temptation to epilate only the affected area. However, it is easy to overlook a small patch of ringworm elsewhere on the scalp and even when this is not done new patches may develop after epilation in other areas. If this happens it will be difficult or impossible to epilate the remainder of the scalp without giving the area originally treated a second dose and running the risk of permanent alopecia in this area.

SUBSEQUENT COURSE

After irradiation there is a latent period of between 15 and 21 days before the hair falls. In some cases at the end of 21 days the hair is loose but much of it will not fall out spontaneously. In cases of this sort the hair must be removed either with flat tipped tweezers or by covering the scalp with large pieces of adhesive tape, which are pressed against the scalp and left on for a short

time. When the adhesive is pulled off most of the hair comes with it and any remaining hairs are removed with the tweezers. Following epilation the scalp is treated with suphur or ammoniated mercury ointment to destroy the fungus. A skull-cap made of an old sheet or handkerchief should be worn by the patients to prevent spread of the disease to others and the scalp should be washed with soap and water daily.

CONCLUSIONS

An epidemic of ringworm of the scalp, which has been spreading in the United States, has apparently reached Oklahoma in the past few years. There is an increasing incidence here, as elsewhere, of cases resistant to ordinary treatment measures. Such cases can be treated most effectively and satisfactorily by epilation of the scalp hair with x-rays.

PROTEIN METABOLISM AND THE USE OF AMINO ACID PREPARATIONS*

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Good nutrition is essential for health and nowhere is it more necessary than in those individuals needing to regain health. The maintenance of good nutrition requires the ingestion and utilization of sufficient amounts of the essential foodstuffs. These are roughly classified as: 1. proteins, 2. fats, 3. carbohydrates, 4. electrolytes or minerals, 5. vitamins, and 6. water.

Mor many years parenteral alimentation was limited to the use of glucose and electrolytes. With the development of protein hydrolysates, it became possible to administer this type of food to patients unable to take adequate amounts of food, and the importance of protein metabolism has become of paramount consideration.

PROTEINS AND AMINO ACIDS

Proteins are large molecules composed of many amino acids. These molecules are not constant or static, but are in a continual state of dynamic metabolic flux. Proteins after being taken into the digestive tract are hydrolyzed to amino acids which are absorbed and carried by the blood stream to all parts of the body. A resynthesis to protein takes place in which the amino acids are combined to form the type of protein particular to each organ and tissue. The liver performs an important part in this resynthesis and in preparing the proteins for the blood plasma.

The use of radioactive isotopes or tagged elements has shown experimentally that there is a constant interchange between the protein elements of various structures and that, depending upon the need, these elements may be shifted from one tissue or organ to another. Such interchange is going on continually among the plasma proteins, hemoglobin, the proteins of liver, body tissues, and general reserves.

The protein needs of an individual depend upon the amount of exercise or work, tissue repair, growth, age, body weight, and whether an individual is pregnant or is lactating. The daily requirement usually stated is one gram per kilogram of body weight, or one-third to one-half gram per pound. This amount of protein is a satisfactory minimum under normal conditions. In diseases, however, such as disorders of the liver or kidneys, the daily requirement may be as high as 200 to 300 grams. For that reason, it is more accurate to say that the protein required is from 50 to 200 grams per day, depending upon the body needs. The actual requirement of the individual is the amount necessary to maintain normal nitrogen balance; that is, equalize between the nitrogen intake as protein and the output of nitrogen.

Nitrogen can be determined readily in the laboratory. Approximately 16 per cent or 1/6 (to be more exact, 1/6.25), of the protein molecule is composed of nitrogen. Thus by multiplying the nitrogen determination by the factor 6 25, the amount of protein taken in or given out can be calculated. Individuals during growth, pregnancy, and convalescence are usually in positive nitrogen balance. Patients suffering from trauma, surgery, fever, or liver, kidney, and certain other diseases where protein needs are great, are in negative balance, unless protein is supplied in relatively enormous

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amounts in the food or by administration of hydrolysates.

Amino acids, as has been stated, are the fundamental building units of proteins. Twenty-three different amino acids are found in proteins used to meet bodily needs. Many of these can be built up within the body itself. On the other hand, 10 of such acids cannot be manufactured in adequate amounts in the body, hence must be supplied in the food. They have, consequently, become known as *essential amino acids*. The other 13 are called nonessential. Unfortunately this is not a good term because they *are* essential, or necessary for proper nutrition. The word merely means that some of these acids can be synthesized in the body in adequate amounts and it is unnecessary, or not essential, that they be taken in from the outside.

Proteins may contain several thousand molecules of some of the 23 amino acids. These are laid down in definite or regular patterns within the protein molecule. Serum albumin, one of the best known proteins, with a molecular weight of about 70,000, contains 618 amino acid units. All of the amino acids are not contained in all proteins, but those that do have all of the essential amino acids are known as *complete* proteins. These are usually of animal source, such as meat, and the milk proteins, casein and lactalbumin. Incomplete proteins, on the other hand, are those which do not contain all of the essential amino acids, and are usually of plant or vegetable origin. In spite of their deficiency in certain amino acids, these foods serve as excellent nutritional elements in mixed diets which contain other proteins. The sum total of such a diet should give all of the essential amino acids.

PROTEIN DEFICIENCY

We are not particularly concerned here with an excess of protein. The chief problem is that of a deficiency, or inadequate amount of protein in the body. This condition is often referred to as "hypoproteinemia." One can readily understand that such a designation may be misleading for hypoproteinemia refers only to plasma proteins and is no indication of the depletion of proteins in the tissues. An individual on a deficient protein intake may lose as much as thirty times more nitrogen or protein material from the tissues than from the blood. The body has the ability to hold a reserve supply of protein in the blood until the protein in the tissues has been drained to a dangerous degree.

The protein reserves in the tissues may therefore be almost entirely used, and at the same time blood tests will give a relatively normal plasma protein determination. Consequently, clinical judgment, observation, and past history of the patient may be more important than laboratory findings on the plasma proteins. For example, a physician does not need a laboratory test for plasma proteins in order to know that a patient with a condition such as gastric carcinoma, who has been on a poor diet for several months, and who has lost 20 to 40 pounds in weight has a protein deficiency.

CAUSES OF PROTEIN DEFICIENCY

The causes of protein deficiency may be grouped as: 1. insufficient intake, 2. faulty utilization, and 3. excessive elimination. Although examples of these are obvious, a few factors should be mentioned. Under insufficient intake may be included undernourishment, malnutrition, and famine. Another type of insufficient intake occurs when an individual eats adequate amounts of protein, but not enough of the protein-sparing carbohydrates which normally serve as the source of immediate energy. When the carbohydrates in the diet are inadequate, the body utilizes protein for energy and does not leave a sufficient amount for supplying nitrogen to the tissues. There may be very real disturbances involved, such as anorexia nervosa, with its extreme aversion to food, pain and discomfort because of faulty dentures, and obstructions of the gastrointestinal tract, such as tumors and strictures.

Imperfect utilization of food because of inadequate secretion of digestive juices, or enzymes as in achlorhydria, gastritis or enteritis, or faulty absorption must also be considered. There may be excessive loss due to pernicious vomiting, chronic diarrhea, dysentery, ulcerative colitis, or sprue. Stools which are bloody or contain pus may indicate that additional protein is being lost. Chronic hemorrhages from fibroids, hemorrhoids, uterine or rectal carcinoma are frequently sources of protein loss. Deficiency caused by kidney disease may be great and require an increased amount of protein to counterbalance the loss. Farr, et al, within a two-year period reduced mortality of nephrotic patients with pneumococcal bacteriemia from 60 per cent to almost zero by maintaining the patients in nitrogen balance by the additional supplementary administration of protein hydrolysates[1].

Other conditions which cause loss are: burns, hypoxia, hemorrhage, and increased metabolism. Fever or infection bring about an increased breakdown of proteins within the body resulting in an excessive loss of nitrogen. During a course of artificial fever therapy, nitrogen loss may be as high as 50 to 150 grams, which in terms of protein may be equivalent to one to two pounds of body protein. The metabolic activity of thyrotoxicosis causes a rapid nitrogen depletion; 60 to 70 per cent of such patients show protein deficiency. Pregnancy is accompanied by increased demands on the part of both mother and fetus. The decreased incidence of toxemias following improved prenatal care in which higher protein diets are given speaks eloquently for the importance of this therapy.

The very act of lying in bed for an extended period of time may cause negative nitrogen balance. An excellent study illustrating this factor was made on conscientious objectors and reported several months ago.[2] In these experiments, healthy young normal individuals were placed in casts from the hips down for periods of six weeks, during which time it was difficult to maintain them in positive nitrogen balance. Approximately six weeks elapsed after removal of the casts and a return to regular active life before normal metabolic activity was attained. Thus any condition in which there is debilitation requiring continual bed rest means an increased loss of nitrogen and a protein deficit in the body.

The problem of protein deficiency after surgery must always be considered. Previous to operation, the patient is frequently on a reduced food intake; he may have impaired digestion and absorption, and often a complicating chronic infection with fever. The trauma of surgical manipulation itself involves a considerable loss of nitrogen. In a traumatic incident, such as fracture of a femur, or severe burn, 30 to 40 grams of nitrogen may be lost per day over and above the regular loss. Transposed into protein equivalent, this may mean as much as 200 grams of protein depletion each day. During surgical manipulations, nitrogen loss sometimes becomes two to four times greater than normal. Sixty per cent of patients subjected to major surgery show hypoproteinemia, and the incidence increases to over 80 per cent when the surgery involves the gastrointestinal tract. Anesthesia itself may be a cause of increased tissue breakdown. One can readily see, therefore, the importance of the administration of protein substances in pre- and post-operative care.

Clinical conditions ascribed to protein deficiency include disturbances in water balance, lowered resistance to infection, retarded wound healing, anemia, and a disturbed function of the individual cells of each organ and tissue in the body. In nutritional edema, which is a good example of a fluid imbalance, the body and blood proteins reach such a state of depletion that osmotic colloidal pressure can no longer maintain normal hydrostatic blood pressure in capillaries. The resultant fluid accumulation is greater than the lymph flow can handle and edema results. Patients in this condition usually are afflicted with anorexia and asthenia, which unless corrected, intensify a vicious cycle.

In the edematous condition one sometimes overlooks the fact that visceral organs are also affected. For instance, in such conditions, the gastrointestinal tract is edematous, friable and swollen. Its normal functions of motility, secretion, and absorption cannot be carried on properly. The same is also true of the kidney, liver, and other structures of the body. In recent experiments on laboratory animals, we have found that sex cycles cease after the animals have lost ten per cent of their weight following a protein deficient diet. When 30 percent of the body weight is lost, it sometimes requires months before the animals return to their normal reproductive functions. One can contemplate the relationship of chronic protein deficiency to sterility, menstruation, and other functions of the sex glands.

Anemia is always a by-product of severe chronic protein deficiency. This might be suspected, since 95 per cent of hemoglobin consists of amino acids. Experimentally, anemia may be produced by placing the individual on an inadequate protein intake. Thus in therapeutic procedures concerned with the treatment of anemias, proteins should be considered along with iron and erythrocyte-maturing factors.

It has been well established that dietary protein restriction leads to a lowered resistance to infection. Some have offered the explanation that there is a diminution in the production of phagocytic cells during the accompanying atrophy of the liver, spleen, bone marrow, and lymphoid tissue. The immune antibodies which are present in plasma as gamma-globulins are three to five times as high in well-fed individuals as in those on protein deficient diets[3]. This probably explains the increased incidence of

epidemics and pestilences following famine or war.

Also in this category may be included wound healing, which is retarded during protein deficiency and speeded up when adequate protein is added to the diet or administered in other ways. A disruption in healing is a complication in one to three per cent of abdominal operations. Clinical studies and laboratory experiments indicate that a high percentage of such cases can be attributed definitely to protein deficiency[4].

When diet is markedly restricted in the treatment of obesity, it may be difficult to maintain a high protein intake, low in fat content. For the well-being of the patient, nitrogen balance should be maintained.

In peptic ulcer, negative nitrogen balance frequently occurs due to hemorrhage in acute cases, or to the prolonged maintenance of the patient on a restricted diet. Diets planned to avoid over-stimulation of acid in the stomach are frequently low in protein so necessary for ulcer repair and the general well being of the patient. When protein hydrolysates are included in the regimen, not only is readily available protein given the patient, but the amino acids act as excellent buffering agents as well.

CORRECTION OF PROTEIN DEFICIENCY

Protein therapy may include: 1. dietary management, 2. the use of blood and blood derivatives, and 3. protein hydrolysates. The indications for the use of any of the above procedures are quite specific, depending upon the nature of the condition causing the protein deficiency.

Diet: The use of increased dietary protein should be considered first in those individuals who, because of appetite and adequate function of the alimentary tract, can ingest and utilize the required amount. Many patients, however, are unable to take in or digest the necessary amount of protein in the form of food. These patients may require parenteral or supplemental feeding.

Blood and blood derivatives: Experience in the late war and in modern surgery has demonstrated the worth of whole blood, blood plasma, and serum albumin. These substances are used when the need is acute and the loss of blood protein is great, such as in severe liver and kidney disease, excessive hemorrhage, or excessive trauma or stress. Many physicians prefer to use whole blood, in that way utilizing the protein of hemoglobin as well as the plasma protein.

Plasma, however, continues to be used extensively to replace the protein lost from the blood. Its chief advantage is that it is effective immediately. Even though proteins found in the infused plasma are eventually broken down or re-formed into the specific types characteristic of that individual receiving the infusion, they have in the meantime accomplished their purpose and helped the patient over the immediate crisis.

For chronic conditions and where the need is not immediate, the use of plasma to replenish the plasma proteins is inefficient. For example, normal plasma contains approximately seven grams of proteins per 100 c.c. of plasma; or 70 grams per liter, thus it would require approximately two liters of blood per day to furnish the minimum of 70 grams of plasma protein for the average sized adult. The use of protein hydrolysates is far less costly and more efficient in these cases.

With the purification of human serum albumin and its availability through the American Red Cross, a new agent to aid in combating the effects of severe protein deficiency has been developed. It is particularly effective in relieving the ascites of cirrhosis, and promises a great deal of assistance in preparing nutritionally hypoproteinemic patients for surgery. Albumin therapy is less effective in the nephrotic state and is of questionable value in counteracting the edema of cardiac decompensation.

Amino acid preparations or protein hydrolysates: Protein hydrolysates may be prepared by treating proteins with 1. acids, 2. alkalies, or 3. enzymes. Alkaline hydrolysis leads to racemization of the resultant amino acids and; consequently, is not used to any extent in the commercial preparation of this type of hydrolysate.

Amino acid preparations may be utilized either parenterally or orally. In cases of extreme weakness and debility, vomiting, diarrhea, ulcerative colitis, the acute stages of peptic ulcer, and similar conditions, the preparation is best given by vein slowly in a two to five per cent solution. Results with Amigen (Mead-Johnson Company) have been most gratifying, with few and only minor side reactions. Parenamine (Stearns) has also been used successfully. An excellent treatise on the subject of "Parenteral Administration of Amino Acid Preparations" has recently been published[5].

Because of the occasional side reactions, cost, and extra precautions necessary for administration of protein hydrolysates, it

is often preferable to give them orally. The predigested protein is absorbed within 15 to 30 minutes, so there is little work necessary on the part of the digestive tract. A tube may be placed into the stomach or duodenum and, even in cases of gastrectomy the patient may receive nourishment within an hour after surgery.

The chief objection to the enteral use of protein hydrolysates is the taste. We have successfully used one preparation, Nitramac, (Maltine Company) which eliminates this disadvantage by putting the hydrolysate in tablet form. The number of tablets necessary to obtain satisfactory results might seem to be a disadvantage of this preparation. We have found, however, that patients do not seriously object to taking relatively large numbers of the tablets per day. To date, we have given this preparation (Nitramac) to a total of 18 patients. Some of them took as many as 120 tablets a day for a period of 16 weeks. This type of therapy is particularly adaptable as a supplement to the diet in pre- and postoperative treatment, as well as ambulatory patients with varying degrees of debility who require supplemental feeding. As stated above, amino acid preparations are less effective than blood and plasma derivatives in acute conditions. Changes in the concentration of plasma proteins may not become apparent for as long as 10 days after the daily administration of hydrolysate preparations has been started. Clinical improvement, however, may be noted a considerable time before the plasma protein increment is evidenced. This may be due to the prior utilization of the nitrogen to restore other deficient structures before it is used by the body to produce plasma proteins. This is particularly true in cases of many of the vital organs, especially the liver, the weight of which decreases rapidly during fasting, or during inadequate protein consumption.

In an experimental study on laboratory animals, we found that the amount of liver protein decreased an average of 49 per cent after the animals had been on a protein deficient diet for a period of 10 weeks. The body weight loss during this time was 32 per cent. It has previoulsly been shown that this decrease in liver protein represents the loss of actual liver cytoplasm and not the stored or deposited reserve.[6] After the animals were again placed on an adequate protein intake, 34 per cent of the deficient liver protein was replenished within seven days. This regeneration in the liver occurred before there was any change in plasma protein or red cell count.

Therapy with protein and protein hydrolysates must be accompanied by adequate amounts of carbohydrates, which are normally used as the immediate source of energy. If insufficient amounts of carbohydrates are present, the body will utilize for immediate energy the proteins that would normally go into the formation of muscle and tissue protoplasm. For this protein-sparing effect as much as 150 to 300 grams of carbohydrates per day are required. Adequate fluids and vitamins should also be furnished, but salt should be used sparingly.

It may not be amiss to give a word of warning here. The exploitation of amino acid preparations is developing to a degree comparable to that of vitamins and cathartics. Many different preparations have appeared in the last few years. Some manufacturers, in an attempt to increase the palatability of their products, or to stimulate the interest of the physician, have combined their preparations with other substances. The patient who requires supplementary protein needes it in rather large doses. Any preparation, therefore, the advertising of which recommends a dosage in terms of teaspoonfuls, should be considered undesirable for the treatment of protein deficiency. Such inadequate therapy is like the proverbial "spit in the ocean."

BIBLIOGRAPHY

1. Farr, L. E., Emerson, K., and Futcher, P. H.: The Comparative Nutritive Efficiency of Intravenous Amino Acids and Dietary Protein in Children with the Nephrotic Syndrome, J. Pediatrics, 17:595, 1940.
2. Deitrick, John E., Whedon, G. Donald, and Shorr, Ephreim: The Effects of Immobilization upon Various Metabolic and Physiologic Functions of Normal Men, Am. Jr. Med. 4:3, (Jan.) 1948.
3. Cannon, P. R., Chase, W. E., and Wissler, R. W.: The Relationship of the Protein Reserves to Antibody Production, Jr. Immunology 47:133, 1943.
4. Locolio, S. Arthur, Chassin, J. L., and Hinton, J. William: Tissue Protein Depletion in Wound Disruption, Surg. Gyn. and Obs. 86:107, (Jan.) 1948.
5. Elman, R., Parenteral Alimentation in Surgery, New York, 1947, Paul B. Hoeber, Inc.
6. Kosterlitz, H. W.: Effect of Dietary Protein on Liver Cytoplasm, Nature 154:207, 1944.
7. Conferences on Therapy (Cornell University Medical College): Use of Protein Hydrolysates, Am. Jr. Med. 3:472 (Oct.) 1947.
8. Keeton, Robert W., Cole, Warren H., Calloway, N., Glickman, N., Mitchell, H. H., Dyniewicz, J., and Howes, D.: Convalescence: A Study in Physiological Recovery of Nitrogen Metabolism and Liver Function, Ann. Int. Med. 28:521 (Mar.) 1948.

ATTEND THE A.M.A.
INTERIM SESSION
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NOVEMBER 30—DECEMBER 3

SYMPTOMOLOGY AND TREATMENT OF SPONTANEOUS SUBARACHNOID HEMORRHAGE*

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Acute subarachnoid hemmorhage is the symptom complex of a serious vascular disorder within the skull and as such has many etiological bases. The most widely studied and well understood is that caused by rupture of miliary or berry-like aneurysms located on the circle of Willis. These are often at the bifurcations of the arteries, but others occur on the unbranched segments, the internal carotid artery within its canal and that portion within the cranium. These anomalous dilatations are thought by Dandy[1] to be remnants of an absorbed vascular network which forms the embryonic circulation of the early brain. Forbus[2] and Cuthill[3] have shown that defects in the intimal and muscular coats of the arterial walls are probably the primarily thinned areas where aneurysms develop. Mycotic aneurysms sometimes accompany septicemia and the destructive arteritis may thus cause subarachnoid bleeding. Athero- and arteriosclerosis in the Circle, the carotids and the basilar arteries are other causes for aneurysm formations. They likewise can cause bleeding when they rupture. Syphilitic arteritis is an alleged cause of aneurysm formation; but in perusing the literature one finds little basis in pathological material to suport this claim.

Martland[4] and recently Wechsler and Gross[5] have presented evidence that vascular malformations of arterial and venous channels and hemangiomas may be associated with abrupt subarachnoid bleeding. The role of primary blood dyscrasias, intracerebral and ventricular hemorrhages, and disorders of the coagulation mechanism associated with heparin and dicumarol therapy should be mentioned as causes for the syndrome under discussion for completeness sake. We have been interested in the variable symptomology in several cases observed recently and attention is brought to them by brief abstracts.

Case No. 1—Miss B. B.—No. 32,570. A 46-year-old utilities clerk was first examined because of pain behind the right eye and ptosis of the right eyelid. This had sudden onset. Three years previously she had experienced pain behind the right ear. At that time it was excruciating, and over a period of four-five weeks narcotics ere needed for relief. Then followed three-four years of relative freedom from pain. Three weeks before examination she had sudden lancinating but intermittent pain in the right frontal area. Nine days previously she awoke with ptosis of the right eyelid and an exacerbation of her retrobulbar pain. At the time of examination she was afebrile, acutely ill and complained of nausea. There was right oculomotor and trochlear paralyses with a fixed dilated pupil on the same side. Other neurological signs were absent. Examination of the spinal fluid revealed normal pressure and grossly bloody fluid which did not clot. The red cells were crenated and the supernatant fluid clear. Skull films, serology and blood counts were all normal. A second lumbar puncture was done three days later with identical findings. With sedation and rest headache subsided. The ocular palsies persisted, but she was able to resume work three months later.

Case No. 2—Miss V. T.—No. 29,500. A 45-year-old schoolteacher was admitted semi-stuporous with the following history as obtained from relatives. She was well until four months before admission at which time she had gradually increasing bitemporal headaches. Twelve days before admission she experienced more severe pain in her head and after lunch felt faint and became unconscious for a period of an hour and a half. Following this she regained consciousness, became alert and lucid but continued to have headache. Later that day she developed ptosis of the left eyelid. The day of admission she became semi-stuporous, and the left pupil appeared larger than the right. Physical examination revealed a well developed nourished woman with nuchal rigidity in a semi-stuporous state. There was a left third nerve paralysis and

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weakness of the left sixth nerve, bilateral papilla edema and a flame-shaped hemorrhage in the left disc. No diagnostic lumbar puncture was done. She responded gradually and became conscious over the next few days. The cranial nerve signs persisted. There was a sudden recurrence of all her symptoms seven days after admission followed by a quick demise. Postmortem showed a ruptured miliary aneurysm at the junction of the left carotid and the anterior and middle cerebral arteries. There was moderate extension of the hematoma over the right cerebral lobes and into the base. The aneurysm was surrounded by a soft partially organized clot.

Case No. 3—Mr. H. R.—No. 35,291. Is a married 33-year-old lumberyard operator. This man had experienced left temporal migraine since the age of 20; furthermore, he had complained of many ill-defined somatic discomforts from time to time. Several months before admission he became depressed and anxious. This was thought to be related to his work situation. Eleven days before admission he developed anorexia followed in one day by vomiting and diarrhea. The third day he developed frontal headache, vertigo and blurring of vision. Then followed three days in bed. After this he felt better and upon walking that day he experienced left frontal headache again. Two days later he was examined, and at that time complained of general malaise, mild headache and blurring of vision. Physical and neurological examinations were essentially non-revealing. A GI series was normal. X-rays of the skull revealed no increase in pressure, but an unusually prominent vascular marking in the occiput. A right homonymous hemianopsia was demonstrated after neurosurgical consultation. Following this we did a lumbar tap. This revealed pale xanthochromic fluid with 50 lymphocytes per cc. and normal protein. No further symptoms were noted, and there was gradual recovery with return to work one month later. The hemianopsia persisted.

Case No. 4—Mr. J. C.—No. H-28,067. A 64-year-old farmer entered the hospital comatose. Sixteen hours before while driving a car he suddenly experienced excruciating occipital headache. This was followed quickly by nausea and repeated emesis and progressive stupor. At the time of examination he had a temperature of 100.4°, regular pulse of 62 and deep respirations of 24 per minute. The pupils were equal and fixed with a marked downward gaze. The fundi were not well visualized. There was marked nuchal rigidity and positive Kernig signs. Deep reflexes were equal and brisk. Bilateral Babinski's were present. Spinal tap revealed marked increase in presure with grossly bloody fluid which did not clot. Repeated punctures with the removal of 8-12 ccs. of bloody fluid were done over the next 15 days because of restlessness. Gradually the bleeding stopped, the fluid became xanthochromic and eventually clear; and he was able to return to modified work, improved, two months later.

Case No. 5—Mr. K. M.—No. 31,624. A 48-year-old attorney entered the hospital because of a left-sided headache with nausea and emesis of four days' duration. At its onset two grs. of morphine had been needed to allay the severe symptoms. Previous history revealed evidence of marked emotional instability in personal relationships and in his work with mild periodic headaches which were relieved by asprin. Physical and neurological examinations were entirely normal. There was no nuchal rigidity at the time of examination. He was observed for two days; and because of increasing headache a diagnostic spinal puncture was done, which produced grossly bloody fluid. Two subsequent punctures were done for symptomatic relief of the headache. Twelve days after the onset the patient was free of symptoms, and the spinal fluid was clear in color. He returned to work in one month.

In re-analyzing these few cases, it became obvious that not always does the clinical history of subarachnoid hemorrhage follow the classical sequence of acute headache, pain, stiff neck and coma. For example, in case No. 1 the history covered a period of three years, which we would relate to the lesion, during which time the patient had recurrent symptoms in the right frontal and occipital regions. Finally, with marked expansion and rupture of the aneurysms she developed cranial nerve palsies related to the third and fourth nerves. These together with blood in the spinal fluid made the diagnosis obvious. It is interesting to note that statistical studies showed that 30 per cent to 40 per cent of these patients have repeated episodes and extraocular palsies, one of the most common objective findings. These two signs are probably extremely important in tracing the etiology of headache, which the physician is so frequently called on to do. In case No. 2 the symptoms were of four months' duration, and there was strong suggestion of a space-

occupying lesion in the cranium as evidenced by progressive headache with papilledema and periods of unconsciousness. In view of these signs and symptoms no lumbar tap was done immediately. Only the neck rigidity finally suggested the diagnosis before death. The appearance of papilledema then can readily be a part of the symptom complex of subarachnoid hemorrhage and should always be carefully searched for. In case No. 3 we probably have one of our most interesting findings. After several days' observation, our working diagnosis was depressive psychosis. Only when visual field defects were definitely demonstrated and the history of headache, vertigo and emesis were again separated from the multiple somatic complaints did we entertain the true reason for his main and recent illness. By the time the spinal fluid was examined the acute hemorrhage was apparently subsiding, but the xanthochromic fluid which was highly significant was obtained, and this represented to us previous subarachnoid bleeding. The site of the lesion was probably near the optic tract on the left side. Case No. 4 gave a rather classical history of the onset and development of subarachnoid bleeding. This gentleman was about 64 years old and probably represented bleeding from an arteriosclerotic aneurysm, though this we will probably not know. His onset was sudden, dramatic and rapidly progressive, coma quickly developed and by the time we saw him he was in deep stupor with general signs of rapidly increasing pressure and no localizing findings. During his period of acute symptoms he also had marked restlessness with occasionaly generalized tonic-like muscular movements. In case No. 5 left-sided headache of severe character was the only symptom. There were no signs until the spinal fluid was examined and found to be bloody. This is always a warranted procedure in severe headaches without evidence of choked discs.

The plan of treatment has been rather simple until recently. Rest in bed is primary. Sedation is used as necessary and analgesics for pain. Occasionally hypertonic solutions may be used to advantage, either intravenously or per rectum. Repeated lumbar punctures have been used by us to advantage—particularly to relieve the restlessness or increasing stupor these patients often develop. The upright position is bed is occasionally advocated by some, mainly for its mechanical effect. Within the last five years more emphasis has been made for neurosurgical treatment in selected cases. If lesions are well localized, either by their symptoms or arteriography, ligation of the aneurysm is occasionally feasible. Careful evaluation before this is done is very necessary, because often one carotid vessel is sacrificed at the time, and tests for the adequacy of unilateral circulation must be made. Procedures such as this are particularly indicated in the early decades and where repeated episodes of bleeding have occurred. Prophylactic treatment can only be carried out where the diagnosis has been made early by arteriograms or by surgical exploration itself. These methods are being used more commonly now; and although the risk to the patient is rather great in the acute episode, these considerations should be kept in mind.

The over-all prognosis in this particular symptom complex is not good. Approximately 50 per cent of the patients died in their acute episodes[6]. Repeated hemorrhage, however, is not necessarily a bad prognostic sign as was formerly thought. At the end of 15 years some statistics show that about 16 per cent of the patients are still living. It is thus obvious that the disease is a serious one and the long range view not particularly good. Consequently perhaps we will be warranted in the future in doing more extensive investigative work when it seems indicated.

In summary, the symptomology of spontaneous subarachnoid is multiple. It includes chronic recurrent episodes of headache often of a migraine character; extraocular palsies —particularly of nerves three, four and six; motor signs of hemiplegia, partial or complete; Babinski signs; Kernig signs; nuchal rigidity! blood in the spinal fluid which does not clot; convulsive seizures; papilledema and hemorrhage and occasionally x-ray evidence of calcified shadow in the suprasellar region or destructive changes in the skull. Treatment at the present time is in a state of change and for the acute episode probably the conservative course is best followed. This includes rest in bed, sedation and repeated lumbar punctures as indicated.

BIBLIOGRAPHY

1. Dandy, W. E., Padget, D. H.: Intracranial Arterial Aneurysms. Pp. 67-90, Comstock Pub. Co., 1945, Cornell Univ.
2. Forbus, W. D.: On the Origin of Miliary Aneurysms of the Superficial Cerebral Arteries. Bull. Johns Hopkins Hosp., 47:239, 1930.
3. Tuthill, C. R.: Cerebral Aneurysms. Archives of Path-J.A.M.A., 136:517, (Feb. 21) 1948.
6. Hamby, W. B.: Spontaneous Subarachnoid Hemorrhage of Aneurysmal Origin. J.A.M.A., 136:522, (Feb. 21) 1948.
ology, 16:630, 1933.
4. Martland, H. S.: Spontaneous Subarachnoid Hemorrhage. Am. J. Surg., 43:10, (Jan.) 1939.
5. Wechsler, I. S. and Gross, S. W.: Cerebral Arteriography.

CLINICAL PATHOLOGIC CONFERENCE

Presented by the Departments of Pathology and Medicine
The University of Oklahoma School of Medicine

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DR. HOPPS: The major disease from which this patient suffered is probably obvious to all of you who have studied the protocol. The precise status of this disease and the exact mechanism by which it terminated the patient's course is not so obvious. We are looking forward to Dr. Bayley's detailed evaluation of these changes.

PROTOCOL

Patient: L. W., white male, age 61. Admitted October 20, 1947. Died November 3, 1947.

Chief Complaint: Dyspnea (two and one-half years), abdominal pain (three months).

Present Illness: Two and one-half years prior to admission the patient noted the onset of exertional dyspnea. Six months later he suffered an episode of severe precordial pain which radiated down the left arm. His physician advised six weeks bed rest. However, after five days he returned to work. Following apparent temporary recovery there was a gradual onset of increasing dyspnea, pedal edema, orthopnea and paroxysmal nocturnal dyspnea. Six months after the initial episode the above symptoms became quite marked, for which his physician prescribed what apparently was digitalis. The patient continued this medicine erratically from this time. He experienced several subsequent attacks of precordial pain which were initiated by slight exertion. Two months preceding admission he began to have sharp back pain that radiated around the costal margins, relieved only by "hypos." This bore no relationship to meals or to any type of food; however, there did seem to be associated flatulence and eructation. In addition, the patient experienced mild, generalized, dull aching abdominal discomfort. During the three days prior to admission he was nauseated and vomited soon after eating. He lost 50 pounds in the two years prior to admission. There was no diarrhea or melena. One episode of hematemesis occurred one and one-half years ago when there was "some bright red and some clotted blood."

Past History: The patient was jaundiced for four to five months, associated with "white stools" in 1923. One month preceding admission his wife thought he might have been slightly icteric. He has had a left inguinal hernia for eight years and an epigastric hernia for seven years. About eight years ago a generalized painful skin rash was treated by his LMD.

Family History: Mother died at 80 of "heart trouble and a stroke." Father, who died at 87, also had heart disease. Two aunts and one uncle died of cancer.

Physical Examination: Temperature and pulse were normal; respirations were 22, blood pressure 162/104. The patient was a well developed, well nourished elderly white male who became dyspneic on slight exertion. Multiple lipomata were scattered over the entire body. Pupils reacted sluggishly to light and accommodation. Sclerae were questionably icteric. One diopter papilledema was seen on fundiscopic examination; otherwise eye grounds were negative. The neck veins were distended. Lung fields were clear. Examination of the heart revealed the PMI and left cardiac border to be at the anterior axillary line. There was a soft systolic murmur heard at the base and a similar murmur at the apex. There was slight epigastric and bilateral upper quadrant abdominal tenderness. The liver was palpable four fingerbreadths below the costal margin. There was slight shifting dullness, considered as evidence of abdominal fluid. Rectal examination was negative.

Laboratory Data: Admission urinalysis revealed 2+ proteinuria with a sp. gr. of 1.020. There were 13,750 leukocytes with 81 per cent neutrophils, 4.75 million RBC's and 13 gm. Hb. Blood chemistry studies revealed a BUN of 52.6 mg. per cent, calcium 8.5 and phosphorus 3.7 mg. per cent, icteric index 10, total protein 6.85 gm. per cent, with a normal A/G ratio; Mazzini was 3+, Eagle 4+, but Kahn and Kline were negative. Venous pressure was measured as

250 mm. of saline. Circulation time from arm to lung (ether) was 24½ seconds. ECG on October 21, 1947 was interpreted as interference dissociation, moderate LVH and digitalis effect. A chest x-ray the next day showed the heart to be markedly increased in size with widening and calcification of the aorta. There were increased hilar markings in the lungs.

Clinical Course: Digitalis was administered and other general measures were instituted for relief of his congestive failure. Morphine and demerol were necessary to control the radiating costal pain. The patient had repeated episodes of dyspnea and substernal pain. After temporary improvement, during the first few days, he regressed and failed progressively, became moribund and died on the 13th hospital day.

CLINICAL DIAGNOSIS

DR. BAYLEY: As we review this patient's history and hospital course, we come first to the symptom of exertional dyspnea. It was this that ushered in the present illness and it is this which first directs our attention to a primary disease of the cardiovascular or respiratory tract. From this symptom alone we cannot tell which is primarily involved. We learn that six months later the patient suffered an episode of precordial pain. This is a cardinal symptom of cardiac ischemia and the fact that six weeks bed rest was advised makes us believe that the attending physician at that time considered this to be an effect of coronary disease. We read further to find that there was "a gradual onset of increasing dyspnea, pedal edema, orthopnea and paroxysmal nocturnal dyspnea." This sentence tells us a great deal. We can now state with assurance that this patient has serious heart disease.

At this patient's age, 61, there are three etiologic factors which are responsible for most heart failure: (1) Hypertension, (2) Arteriosclerosis and (3) Syphilis. Since some of the patient's signs and symptoms apear to have been the direct effect of "coronary pain", we must consider which of these three diseases to be most apt to produce such an effect. The cause of coronary pain is in dispute. Some believe it to result from ischemia of the myocardium; others consider it an effect of spasm of the vessel wall. Coronary pain occurs most often in arteriosclerotic heart disease, but it occurs with some frequency also in leutic heart disease. In the latter case this is the result of narrowing of the coronary *ostia* with subsequent reduction in coronary blood flow. However, these persons do not ordinarily manifest outright attacks of so-called typical heart pain. They may have sensations of vague discomfort, choking or pressure behind the sternum, but usually syphilitic heart disease is without sharp pain which radiates down the arm. These patients may have attacks of nocturnal dyspnea. Noctural dyspnea, if due to heart disease, is related to transitory episodes of pulmonary edema. The left ventricle being weakened fails for awhile and fails to move sufficient blood from the lung as provided by the right ventricle. Pulmonary edema results.

The patient experienced several subsequent attacks of coronary pain which were precipitated by mild effort. The sharp back pain radiating around the costal margins which the patient described is impossible to evaluate without more information than we have here. This suggests a radicular type of pain, as is commonly associated with chronic hypertrophic arthritis. Occasionally heart pain will be described in somewhat this manner. If this pain were the effect of radiculitis it would not have been precipitated by exertion and, on the other hand it would probably have been relieved by assuming a certain bodily position. If we had such information within this history we would probably be able to resolve this question. In addition to this, the patient complained of mild generalized abdominal discomfort. As we continue with the history we find that this patient had gone on with his heart disease to a state of general congestion including such effects as enlargement of the liver. This, with congestion of other abdominal viscera is adequate to explain the generalized abdominal discomfort.

It is stated that the patient had lost 50 pounds in the last two years. This is rather on the high side of that which we would expect to occur as a result of congestive failure. Weight loss of such a degree suggests one of three common causes: diabetes mellitus, toxic goiter, or malignancy. There had been no diarrhea or melena, although there was one episode of hematemesis one and one-half years ago. In a man of this age, the vomiting of bright red and clotted blood, without prior gastric symptoms, would most likely be the result of peptic ulcer. These patients will often have as their first symptom of gastric ulcer, the vomiting of blood and will come into the hospital for this reason, without pain.

From the history then, we feel pretty certain that our patient has heart disease. Probably arteriosclerotic, but possibly hypertensive. Luetic heart disease also remains a possibility. It may be that there is a combination of two of the three.

From the past history we note that 25 years ago the patient had a period of jaundice associated with white stools. I don't believe we can do more than speculate on the cause of such an attack. He might have had infectious hepatitis or he might have had a stone obstructing the common duct which became dislodged, although there is no statement of associated pain. The generalized painful skin rash of eight years ago brings up again the possibility of syphilitic heart disease since this may have represented a secondary stage of syphilis. The question of cancer also crops up again as we note the family history and we reconsider the episode of hematemesis of one and one-half years before. If this had been the result of carcinoma of the stomach, continued growth during the succeeding one and one-half years should have produced obvious signs and symptoms.

Now to consider the physical examination. From the blood pressure of 162/104 we can assume that the patient had hypertension. Since the patient had congestive failure at the time this pressure was taken, it is likely that, if anything, it is lower than its "normal." Occasionally in hypertensives, following the onset of congestive failure, the blood pressure will fall to such a degree that it is within normal limits. It may remain at this level for a period of years. The cause of this lowering of blood pressure is not known. It is not simply the effect of a weakened heart, unable to maintain the pressure necessary to force blood through the constricted arterioles. In the case at hand, the blood pressure is not sufficiently high to assure us that hypertension is the major factor in this patient's heart disease. We do know that arteriosclerotic changes and degenerative changes in general bring about a more rapid course than does hypertension. On the other hand ofttimes these two conditions, arteriosclerosis and hypertension, co-exist. At the moment we will consider that our patient may be suffering from the combined effects of these two diseases. The sluggish reaction to light and accomodation of the pupils and the questionable icterus of the sclerae (together with other signs described,) are expected effects of marked congestive heart failure. The papilledema seen on funduscopic examination cannot be readily attributed to passive congestion and may have been the result of arteriosclerosis. The enlarged cardiac silhouette determined upon percussion and palpation, is at last positive objective evidence of heart disease. The soft systolic murmur heard at the base and the similar murmur at the apex have relatively little significance in a patient in this condition. If the systolic murmur had been transmitted to the neck and, particularly if it were associated with a thrill, we would seriously consider calcific aortic valvulitis as a basis for the heart disease.

The liver edge extended four finger-breadths below the costal margin which indicates a considerable degree of hepatic congestion. The pain and tenderness associated with hepatic congestion is greatly influenced by the rate at which the enlargement develops. It is more dependent upon this than on the degree of enlargement as such. With this much hepatic congestion we might expect a slight degree of icterus such as was observed in this patient. By the physical examination alone we have almost excluded syphilis as a basis for the heart disease since we have no evidence of any of the signs or symptoms which are commonly associated with syphilitic heart disease. There is no evidence of an aneurysm or arortic insufficiency.

To turn to the laboratory data, the 2+ proteinuria is an expected finding in congestive failure. The specific gravity of 1.020 indicates good renal function and tells us that hypertension here has not produced serious renal disease. The blood urea nitrogen was elevated to 52.6 mg. per cent. How high may the blood urea nitrogen go as a result of congestive heart failure alone? The NPN may reach 100 mg. per cent in congestive heart failure without primary renal disease. This BUN is perfectly compatible with the diagnosis of congestive failure. Continuing we find that two serologic tests for syphilis were positive, two were negative. This allows us the prerogative of resting entirely with our clinical observations so far as syphilis goes. Circulation time was moderately delayed, additional evidence of congestive failure. The electrocardiogram gives us little information that we do not already have save "interference dissociation" which indicates that the ventricles and the atria were beating at different rates. A chest x-ray revealed the cardiac shadow to be markedly increased in size, which fac

we already knew. The additional information of widening and calcification of the aorta is furnished. In syphilitic aortitis there is frequently marked calcification of the aorta. With these calcific plaques as a marker, the outline of the aorta may be well defined and seen to be quite irregular in contrast to the more uniform dilatation that occurs in hypertension with atherosclerosis. The increased hilar markings of course go with congestion.

The average course of events in a patient with hypertensive heart disease who comes in the hospital for the first time in congestive failure is to recover with treatment. They ordinarily recover from their second attack of congestive failure. To sum it up, the average patient with uncomplicated hypertensive heart disease enters the hospital between three and four times with congestive failure before he reaches his terminal admission. The patient that we are discussing this afternoon seems to have had his last admission on the first visit to the hospital. This has an important implication. The part of the hypertensive heart disease that we can do something about is the work strain on the heart, but if there are fairly advanced coronary changes accompanying the process, there are secondary effects of this ischemia in the myocardium which we cannot correct. Such patients cannot make the comeback which those patients who possess a good coronary circulation do. The course of events in this case therefore suggests that the patient had rather serious alterations in his coronary circulation. The electrocardiogram did not show any definite evidence of myocardial infarction. Does the absence on the electrocardiogram of diagnostic changes exclude cardiac infarction? No. With a routine electrocardiogram we cover primarily the anterior wall of the heart, the diaphragmatic and left axillary surfaces of the heart. The posterior regions are not well covered by such routine leads so that it is possible that an infarct could escape detection without use of multiple precordial leads or perhaps an esophageal lead.

In summary, I believe that this patient had arteriosclerotic and hypertensive heart disease, with congestive heart failure. The fact that he died upon his first admission to the hospital with congestive failure, plus the fact that he complained of precordial pain, indicates that there was probably severe myocaraial damage, else he would probably have made satisfactory recovery following treatment with bed rest and digitalis.

CLINICAL DISCUSSION

QUESTION: Could the hematemesis have been an effect of a ruptured esophageal varices?

DR. BAYLEY: We have no subsequent data to indicate that this patient had Laennec's cirrhosis. Cardiac cirrhosis does not produce sufficient alteration in blood flow to lead to these changes.

PATHOLOGIC DISCUSSION

DR. HOPPS: Reversing our usual procedure I would like to present some histopathologic changes first and correlate them with the disease process as been discussed by Dr. Bayley. The first organ for discussion is the pancreas. Not because of changes in the pancreatic tissue as such, but because of more significant changes in peripancreatic arterioles and small arteries. We found here the *hyperplastic sclerosis* which is the morphologic basis for the fixed stage of hypertension. You are all aware that hypertension is a disease of arterioles. The early stages of hypertension are characterized by spasm, without morphologic changes. If the disease continues, morphologic changes develop in these small vessels, as I shall illustrate to you. There is hypertrophy of muscular coat with a comparable thickening of the intima, these changes leading to an appreciable decrease in size of the lumen. Hyaline change or fibrinoid necrosis is a late effect. On this then we base a pathologic diagnosis of hypertension. Changes in the kidney, namely, slight arteriolonephrosclerosis, further support this. Dr. Bayley was correct, however, in assuming that this patient's kidneys were not seriously diseased, except as affected by chronic passive congestion. The second tissue I shall demonstrate is the aorta in order to illustrate *atherosclerosis*. In this patient, this condition forms the counterpart of the hypertension which I have just mentioned. The two together form a disease complex which, as this patient illustrates, is a bad combination. This same change, atherosclerosis, had occurred in coronary arteries to a marked degree, and herein lay the major difficulty. Hypertension, on the one hand, requires progressively greater cardiac activity and progressively more blood supply in order to maintain a state of balance as opposed to progressive sclerosis of coronary arteries on the other hand which leads to less and less flow of blood and brings a

progressive decrease in the ability of the heart to function.

The heart showed the effects of these changes as Dr. Bayley hypothesized. These changes were reflected in two *old* infarcts (one to two years), one posterior four cm. in diameter, and one anterior seven cm. in diameter. The precipitating cause of death was a condition of *recent infarction* superimposed up on *each* of the old infarcts. This presents some very interesting problems which perhaps Dr. Bayley will wish to discuss. We observe rather frequently that infarction occurs either in successive stages or as a prolonged process rather than as a sudden event. This case illustrates that very dramatically. In both instances the left coronary artery was involved. In one, the anterior descending branch, in the other the posterior descending portion of the circumflex branch was affected. To turn our attention to the kidney, we find a secondary effect of cardiac infraction. The kidney. It, too, presented several recent infarcts. These represent an important complication of recent cardiac infarction, namely, embolic phenomena resulting from dislodgment of a portion of mural thrombus overlying the ventricular infarct. In this instance the only serious effects of thrombotic emboli so originated were found in the kidneys. Finally, to consider the liver, spleen and lungs, we find morphologic evidence of congestive heart failure which was a secondary effect of the primary disease complex, hypertension-atherosclerosis. The liver, in particular, shows the effect of chronic passive congestion and presents areas of frank focal necrosis involving centrolobular portions. Although the *necrosis* is probably an agonal phenomenon, yet the degree of damage indicates prolonged dysfunction and is sufficient to account for the questionable slight icterus which the patient exhibited. When we fit these cellular changes into a broad pattern we reconstruct the sequence of events and provide a basis for explanation and understanding of this patient's signs and symptoms. I only wish that our studies could reveal the essential nature and pathogenesis of hypertension and of atherosclerosis. Our final anatomic diagnosis was:

Cardiac hypertrophy and dilation—clinically hyptertension

Hyperplastic sclerosis of small arteries and arterioles with arteriolonephrosclerosis — morphologically, hypertension

Atherosclerosis, marked, of coronary arteries, aorta, and its major branches

Thrombosis of left coronary artery, old and recent, with old (2 years) and recent (36 hours) infarction

Mural thrombosis of left ventricle and right auricle

Infarcts, recent, fading, in both kidneys

Chronic passive congestion of liver and spleen with focal necrosis of liver

Glycogen infiltration of hepatic nuclei, marked

Fibrous adhesions, old, pleuro-diaphragmatic, lower lobe of right lung

Fibrous adhesions, old, peritoneal, omental, and cecal, to parietal peritoneum

Atrophy of right testicle

Lipomata, subcutaneous, generalized

You will see from this that there are several questions which we have not answered. The nature of the man's back pain is not evident from our studies. We were not aware of its significance at the time and did not investigate the possibility of hypertrophic osteoarthritis. The cause of jaundice described in the past history remains undetermined. If this had resulted from obstruction of the common duct by stone, there should have been residual evidence of cholelithiasis and cholecystitis, which there was not. This may have been the result of catarrhal jaundice which healed without residuum. Careful examination of the stomach and duodenum revealed no evidence of old or recent ulceration, nor were there other changes which might have been a basis for hematemesis a year and a half ago.

DISCUSSION

DR. BAYLEY: It is rather difficult to correlate this man's signs and symptoms with the four distinct infarcts which ere found at autopsy. Particularly during the terminal stages of a patient with congestive heart failure, cardiac infarcts may occur and be "silent." The secondary effects of cardiac infarction which resulted from dislodgment of portions of mural thrombi within the heart have been illustrated here and this point deserves emphasis. As many as 30 per cent of patients dying from cardiac infarction have died as an effect of the secondary embolic phenomena. This is the reason for the considerable success some have experienced in using dicoumarol since this prevents the formation of mural thromb

with their potential hazard. Regarding the question of superimposed infarction, we have occasionally been able to follow the progress of a growing infract by means of electrocardiographic studies. At least one cause of such a change lies in the progressive growth of the thrombus which extends to occlude more and more branches of an artery.

Therapy with anticoagulants would be expected to prevent such changes. Another factor to consider is that at the margin of any circumscribed infarct there is a broad zone in which ischemia exists, but of not such an intensity as to cause actual death of the tissue. These peripheral zones are obviously more susceptible to infarction than normal myocardium in that they possess no circulatory reserve.

TWENTY-FIVE YEARS AGO

Editorial Notes—Personal and General

Dr. G. A. Wall, Tulsa, is attending the College of Surgeons at Chicago.

Dr. Shade Neely, Muskogee, spent a week attending the clinics at Kansas City.

Dr. K. D. Gossom, Custer, returned recently from several weeks' vacation spent in the West.

Dr. S. J. Bradfield, Bartlesville, atteended the American Legion convention at Frisco, last month.

Dr. and Mrs. J. R. Hinshaw, Butler, announce the arrival of J. Raymond on October 8th, weight 8 pounds.

Dr. and Mrs. F. L. Wormington, Miami, spent a few weeks at Kansas City, the doctor attending the clinics.

Dr. and Mrs. B. W. Ralston, Okmulgee, returned from a three weeks' motor trip in the western part of the state.

Dr. Morris Lhevine, Tulsa, is again in his office after two months spent in the northern and eastern Radiographic laboratories.

Dr. E. F. Cannon, Miami, returned recently from a three months' trip through Europe, having visited London and Paris and other points.

Dr. H. D. Murdock, Tulsa, and family, have returned from a motor trip to the Pacific Coast, via the southern route, thence up the Coast to Washington and back home via Yellowstone Park and Colorado.

Dr. Warren T. Mayfield, Norman, chairman of the clinic committee of the Norman Kiwanis club medical clinic for underprivileged children, opened the clinic at the Red Cross rooms there last month. It is fully equipped for examination and minor operations, and will care for patients on Tuesdays and Fridays, with a staff of Norman doctors in charge.

MEET OUR CONTRIBUTORS

John G. Matt, M.D., Tulsa, wrote "Basic Pre- and Post-Operative Treatment for Cancer of the Colon" in this issue of the Journal. Dr. Matt was graduated from the University of Tennessee in 1935 and limits his practice to his specialty, proctology. He is a member of the International College of Surgeons and until 1941, he was chief surgeon, U. S. Lines, New York City. He is secretary-treasurer of the Tulsa County Medical Society and a member of the House of Delegates of the O.S.M.A.

Marque O. Nelson, M.S., M.D., Tulsa is the author of "Ringworm of the Scalp: Treatment by X-Ray Epilation" in the November Journal. Dr. Nelson, whose specialty is dermatology, was graduated from the University of Minnesota in 1923. He is a member of the Oklahoma Dermatological Association.

Robert C. Lawson, M.D., now of Medford, Mass., and formerly of Oklahoma City, presented the paper, "Symptomology and Treatment of Spontaneous Subarachnoid Hemorrhage." Dr. Lawson was graduated from the University of Illinois College of Medicine in 1941 and specialized in internal medicine. He was also in the U. S. army medical corps. At the present time Dr. Lawson is a fellow in medicine, George F. Baker Clinic, New England Deaconess Hospital, Boston, Mass.

Arthur A. Hellbaum, Ph.D., M.D., Oklahoma City, is the author of "Protein Metabolism and the Use of Amino Acid Preparations." He received his Ph.D. degree from the University of Wisconsin and was graduated from the University of Chicago School of Medicine in 1943. Dr. Hellbaum is professor of pharmacology at the Unniversity of Oklahoma School of Medicine at the present time. Among other organizations he is a member of the Society of Experimental Biology and Medicine and the Physiological Society.

The Veterans Administration operates 126 hospitals in the United States. Beds totalling 119,607 are available to veterans in 126 Veterans Administration hospitals.

Additions to Veterans Administration hospitals just completed have added 10,362 hospital beds for veterans throughout the nation.

Veterans Administration hospital libraries contain 952,000 volumes, an increase of 19.7 per cent over the corresponding period a year ago.

President's Page

Your Public Policy Committee early in the year recommended that District meetings be held for the doctors throughout the state. These meetings had several purposes. The two main purposes were to discuss problems facing the medical profession and to organize the profession for proper handling of the problems.

Your officers, councilors, and executive office have carried out the greater part of the recommended program. Many District meetings have been held and others are being held as this is being written. The spirit and attendance at the meetings have been fine.

The next big assignment for us is to assist the State office in the legislative program. Your officers and committees have functioned well in meeting with the legislative council. The last meeting with the legislative council will be held the week in which this is written.

All of you will be interested in the Interim Session of the American Medical Association for general practitioners scheduled for November 28 to 30. These practitioners deserve our tribute and encouragement. It is suggested that many of you make an effort to attend this session.

This last observation is in order. The district meetings have revealed that many of our good doctors do not realize the importance nor the function of the House of Delegates of the Oklahoma State Medical Association. It will be worthwhile for each member of the profession to spend a few minutes studying the operation of the House of Delegates.

C. E. Northcutt

President.

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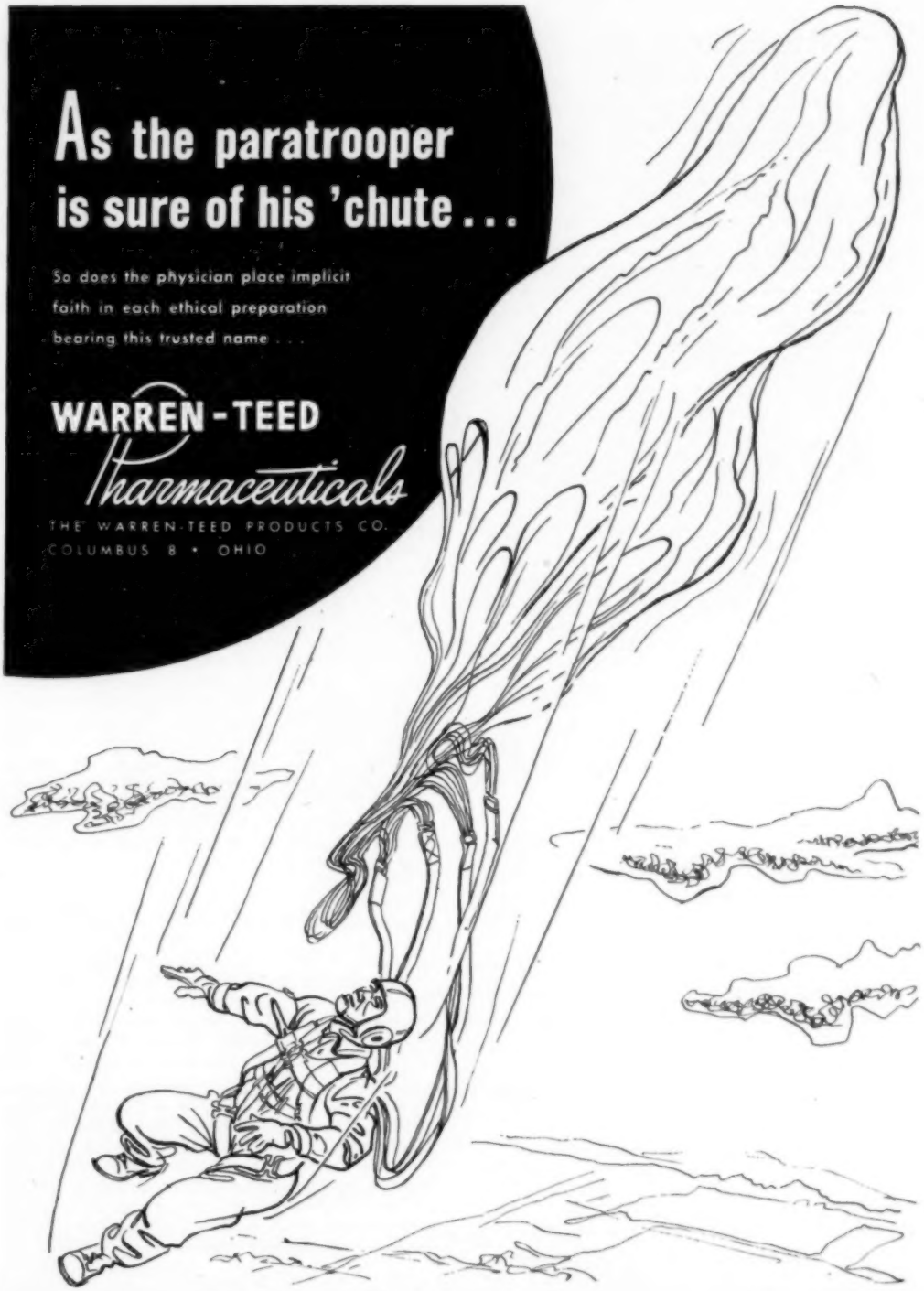

GENERAL NEWS

INTERIM SESSION SLATED IN NOVEMBER

The first national medical public relations conference under the sponsorship of the American Medical Association will be held in connection with the A.M.A. Interim Session in St. Louis. The public relations conference will be held November 27 and the Interim Session is slated for November 30 to December 3. The state secretaries and editors will convene November 28 and 29.

Planning to attend the Interim Meeting as Oklahoma representatives are delegates C. R. Rountree, M.D., Oklahoma City, and James Stevenson, M.D., Tulsa; C. E. Northcutt, M.D., Ponca City, O.S.M.A. president; George Garrison, M.D., Oklahoma City, president-elect; and executive office representatives Dick Graham and John K. Hart.

Designed to be especially valuable to the general practitioner, the session will offer lecture meetings, conducted by medical leaders, on conditions most often seen in daily practice. Subjects to be discussed include diabetes, heart disease, cancer, poliomyelitis, obstetrics, pediatrics, dermatology, genito-urinary conditions, hypertension, anesthesia, tuberculosis, jaundice, laboratory diagnosis, x-ray diagnosis, and physical medicine as applied to the treatment of arthritis.

Diagnosis and treatment will be stressed in a wide variety of clinical conferences, which will be correlated with the lecture meetings. Evening programs will feature distinguished speakers, the award of the general practitioner medal, and fun. Entertainment will be provided, free of charge to physicians and their guests of course, by stars of the amusement world. A scientific exhibit with nearly 100 displays will show clinical and pathological material on subjects dealt with in the clinical conferences. More than 115 leading firms will display technical exhibits.

Officers and members of the House of Delegates will stay at the Statler hotel. Those attending the medical public relations conference will stay at the Lennox hotel. A registration form which enables the physician to save time by securing a registration card in advance is appearing in the Journal of the American Medical Association every other week until the meeting. All reservations must be cleared through the Chairman, Subcommittee on Hotels, American Medical Association, Hotel Reservation Bureau, 1420 Syndicate Trust Building, St. Louis 1, Mo., and must be received before November 9, 1948.

NEW PLAN GIVES STUDENTS MORE TIME IN HOSPITAL

Through the new curriculum now in operation at the University of Oklahoma School of Medicine, junior and senior students have no more than two hours lecture in any one day, with the remaining time spent in the hospital.

Juniors spend the time they are not in class in the in-patient department and seniors are assigned to the out-patient clinic. This arrangement gives students a period of uninterrupted training in wards and clinics. Increasing the efficiency of the plan are the six clerkships, coordinators supervising the training of junior and senior students. Tom Wainwright, M.D., is coordinator in chief.

The new plan, which is a new departure of the Okla medical school, is working well and is proving more satisfactory to both faculty members and students, it was said. Twenty other medical schools in the country are now using the same plan.

In the new curriculum there is more emphasis on psychiatric training than in the past. First psychiatric clinics are in the freshman year and juniors spend a week in psychiatric clerkship at Central State Hospital Norman.

Instead of lectures, each major department has been assigned one afternoon period from four to five for conferences for juniors and seniors. These conferences are open to every physician whenever it is possible for any of them to attend, it was pointed out. Therapeutic clinics are held on Monday, medicine on Tuesday, clinical pathologic conference Wednesday, obstetrics and gynecology (alternating with pediatrics) Thursday, and surgery Friday. Conferences are held at the same time each day. The time, four to five, was selected by necessity because of out-patient clinics, surgery, etc., in the morning and lectures in the early afternoon, it was said.

Reports from the medical school also indicate that the mental health clinic is functioning well and is expanding.

The new wing is now open and the departments not operating at the present time are being held up because new equipment on order has not been received. Surgical equipment is not yet complete but the x-ray department is functioning and the laboratories are completely moved. The fourth floor is open to patients with 36 beds being used. The present facilities in the children's hospital and the main hospital are still cramped and more space is needed in the out patient department. The number of beds for pediatric training is inadequate, it was said. However, a total of 105 beds have been opened in the Children's hospital and the University hospital since Dr. Mark R. Everett assumed his duties as dean, it was explained.

RETAILERS DENOUNCE COMPULSORY HEALTH INSURANCE

As evidence that the medical profession does not stand alone in its fight for the free enterprise system, not only for themselves but for all other business and professional groups, the following from the Special Bulletin of the Oklahoma Retail Merchants Association is quoted:

"Compulsory Health and Disability Benefit Insurance. This is a hot number and it is on the way if we do not block it. Three states have already adopted this sort of legislation and already they are beginning to suffer. No matter how it is sugar coated to make the voters swallow it, the bitter taste comes out as soon as a new bureau begins to operate at the capitol of your state. It is bitter medicine and we retailers in Oklahoma want no part of it. Tell your Legislator that."

Paralyzed veterans, entitled to federal aid for homes specially designed for wheel chair living, may obtain application forms at any Veterans Administration office.

The inactivity following surgery or disease, and often encountered in the aged, makes constipation a likely occurrence. Dehydration, too, frequently is a significant contributing factor.

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RESEARCH IN THE SERVICE OF MEDICINE

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STATE PRAISED FOR RESEARCH FOUNDATION

Alan Gregg, M.D., director for the medical sciences of the Rockefeller foundation at New York, told members of the Oklahoma Medical Research Foundation's committee that "mere size or vast appropriations of money do not guarantee results in the field of medical research."

Dr. Gregg met with the committee for three days in September inspecting the plans of the Oklahoma Foundation and going over other details with the committee.

He also praised the people of Oklahoma for their willingness to contribute money and pointed out to the medical leaders, "You must continually bring the public in on what you are doing. You will fail if there is not an enthusiastic understanding on the part of the public of the importance of true research."

Urging close cooperation between the medical school and the foundation, he asked the foundation to work closely with the school in the cultivation of students who will eventually go into the field of research. He concluded his address with "Finally, its proximity to the medical school will act as a vital spark, improving the whole tone of medical education."

While in Oklahoma Dr. Gregg also spoke to student and faculty audiences at the University of Oklahoma and the medical school and Oklahoma A. and M. College.

TUBERCULOSIS LEADERS HAVE STATE CONFERENCE

"If we could make everyone believe that tuberculosis is a communicable disease, that it is preventable and is curable if found in time, tuberculosis would soon cease to be the major public health problem it is today," R. H. Runde, M.D., told members of the Oklahoma Tuberculosis Association at the annual conference held in Oklahoma City September 27 and 28. Dr. Runde is medical director of the Peoria, Ill., county sanitorium district, and was guest speaker at the Monday evening dinner. His topic was "Why Hasn't Tuberculosis Been Eradicated?"

Other discussions at the two-day meeting included "Responsibility of Tuberculosis Associations in Support of Official Health Service," by John F. Hackler, M.D., Oklahoma City, and round tables on county and district tuberculosis association, mass x-ray, the Christmas Seal campaign, bond sales, and others.

Principal speaker at the conference luncheon Tuesday was Gerald Curtin, editor of the Watonga Republican, Watonga, Oklahoma. Mr. Curtin addressed the group on "The Role of Newspapers in the Crusade to Eradicate Tuberculosis."

VETERANS DEPARTMENT ASKS ASSISTANCE

The State Veterans Department of Oklahoma, in attempting to insure the dependents of deceased veterans that they will receive benefits to which they may be legally entitled, has established a plan of reviewing the death certificates filed each month with the bureau of vital statistics. In order that the review may serve the purpose for which it is intended the cooperation of every physician in the state has been requested.

Particular attention is called to the space on the death certificate requesting information about military service which may have been performed by the deceased. The efforts of every physician in providing as complete information as is available in this space will be a service to the widow and children of deceased veterans who are entitled to various state and federal benefits, it was said.

EVERETT NAMED AMBASSADOR

Mark R. Everett, Ph.D., dean of the University of Oklahoma School of Medicine, was named Ambassador of Pennsylvania and was honored during Pennsylvania Week, September 26 to October 2.

Dr. Everett was one of 22 former Pennsylvanians who were selected as ambassadors because they have become well known throughout their state and nation. Among the others were George C. Marshall, Jimmy Stewart, Hamilton Fisher, Steve O'Neill, Gen. Hap Arnold and James A. Linen, III. Dr. Everett was honored at a banquet September 29 at his former home town of Slatington where he was presented a scroll and other tokens of esteem as Ambassador of Pennsylvania.

A.C.P. MEETING WELL ATTENDED

Thirty eight fellows from Oklahoma and nine visiting fellows of the American College of Physicians attended the regional meeting of the group held in Tulsa September 25, according to Wann Langston, M.D., Oklahoma City, governor for the Oklahoma district.

Governors of the A.C.P. from Kansas, Arkansas and Texas were also present and 11 associate members from Oklahoma and one visiting associate attended the meeting. Among the group registered were 59 non-college guests, several of whom have applications pending. Mark R. Everett, Ph.D., dean of the University of Oklahoma School of Medicine and Dr. Roberts, dean of the Arkansas University School of Medicine, also attended the meeting.

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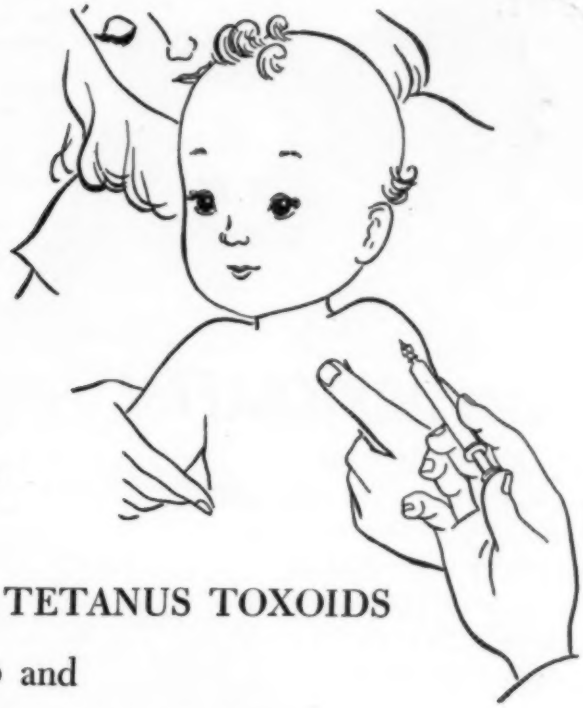

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Floyd Simon, M.D., and Ralph Simon, M.D., announce the opening of their offices at 615½ Frisco Ave., Clinton.

Philip G. Tullius, M.D., announces the opening of offices at 1223 North Walker St., Oklahoma City.

E. C. Keyes, M.D., formerly of Pawhuska, has now moved to Maysville where he will practice.

O. W. Starr's, M.D., sale of palomino and quarter horses was one of the added attractions at the Drumright district fair.

Neeson Rolle, M.D., formerly of Taloga, has opened offices in Seiling, Okla.

Port Johnson, M.D., Muskogee, is one of the chairmen of the health committee of the Muskogee Council of Parents and Teachers.

Henry G. Ryan, M.D., University of Oklahoma graduate, is now practicing at Healdton, Okla.

D. W. Darwin, M.D., formerly of Woodward, has now opened his offices at 3485 South Broadway, Englewood, Colo.

Thomas Dobbins, M.D., Custer county health officer, has announced that an examining clinic for crippled children and other persons interested in vocational rehabilitation is scheduled there.

Approximately 30 Oklahoma leaders in mental health met in September in the Eastern Oklahoma Hospital at Vinita to hear a discussion of problems common to all state mental hospitals. F. M. Adams, M.D., superintendent of the Vinita hospital, and other physicians on the staff there were in charge of the program.

Lewis J. Moorman, M.D., and C. R. Rountree, M.D., Oklahoma City, are co-chairmen in the drive among state physicians to complete raising of $1 million for the Oklahoma Medical Research Foundation.

Van Parmley, M.D., and Mrs. Parmley, Mangum, have been named parents of the Mangum highschool senior class.

Mark D. Holcomb, M.D., Enid, recently discussed plans for the mass tuberculosis survey in Garfield county at a meeting of the Exchange club.

M. L. Peter, M.D., Okmulgee county health department head, has been named Oklahoma representative of the governing council of the southern branch of the American Public Health Association. It covers 12 states.

D. G. Divine, M.D., has closed his offices in Wagoner to assume the position of district health officer of the Oklahoma State Health Department.

J. G. Binkley, M.D., Oklahoma City, has accepted an appointment as part-time assistant health director with Walter H. Miles, M.D., with offices in the Municipal building, Oklahoma City. Dr. Binkley is professor emeritus in obstetrics at the University of Oklahoma School of Medicine.

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MEDICAL SOCIETIES AROUND THE STATE

Garfield County

The September meeting of the Garfield county medical society was a dinner business meeting held at the Hotel Youngblood. No program was planned because of the postgraduate course scheduled for the same night.

Pottawatomie County

Horton E. Hughes, M.D., spoke on "The Surgical Treatment of Diseases of the Prostate" at the September meeting of the Pottawatomie County medical society. C. W. Haygood, M.D., led the discussion.

Oklahoma County

First fall meeting of the Oklahoma County medical society was held September 28 with the program title "Rehabilitation of the Physically and Mentally Handicapped." A color and sound film was presented and Moorman Prosser, M.D., spoke on "Psychiatric Problems in Vocational Rehabilitation."

Kay-Noble

N. H. Cooper, M.D., new director of the Kay county health department, was presented to members of that society at their September meeting. A report on the meeting of the National Physicians Committee in Chicago was given by C. E. Northcutt, M.D., Ponca City, O.S.M.A. president. Dr. Northcutt also presented a past president's certificate to A. S. Risser, M.D., Blackwell. "Cancer of the Colon and Surgical Procedures" was the subject discussed during the scientific part of the program. Guest speaker was W. P. Callahan, M.D., Wichita.

The number of living veterans on Veterans Administration disability compensation and pension rolls has decreased steadily in the past year.

Choctaw, McCurtain, Pushmataha

Druggists from Choctaw, McCurtain and Pushmataha counties were guests of the Tri-County medical society at a meeting in Broken Bow, September 14. E. R. (Pete) Weaver, Stillwater, secretary of the Oklahoma Pharmaceutical association and state drug inspector, was guest speaker.

Payne-Pawnee

C. E. Northcutt, M.D., President of the O.S.M.A., and Dick Graham, executive secretary, spoke on various matters of legislation pertinent to the medical profession at a recent meeting of the Payne-Pawnee county medical society. Twenty-two physicians from Stillwater, Pawnee and Cushing were present.

Comanche County

Physical restoration services offered through the vocational rehabilitation program were outlined for members of the Comanche county medical society by Miss Mabel Sine, Oklahoma City, supervisor of physical restoration for the state vocational rehabilitation program. A colored film was also shown.

Creek County

C. B. Reese, M.D., Sapulpa, was presented a life certificate in the Oklahoma State Medical Association at a meeting of the Creek County medical society. Presentation was made by O. H. Cowart, M.D., Bristow.

Carter County

The Carter county medical society went on record as approving the principals of the Blue Cross and Blue Shield plans at the September meeting of the society. Redistricting was also discussed.

GYNECOLOGY CIRCUIT CLOSES SOON

Dr. J. R. Bromwell Branch is now teaching his last circuit of the two-year postgraduate course in gynecology. The lectures are being given in the nurse's classroom, Western Oklahoma State Hospital, Clinton, each Tuesday night, Watonga clinic, Watonga, Wednesday nights, El Reno Sanitarium dining room, El Reno, Thursday nights, physician's staff room in the Benedictine Heights Hospital, Guthrie, Friday nights, and the Edwards Memorial Hospital for the colored physicians of Oklahoma City on Monday nights.

The course in gynecology has been an outstanding success and the attendance has been excellent, the O.S.M.A. postgraduate committee reports. The committee is now seeking a competent instructor for the proposed course in internal medicine. Approximately 100 colleges, medical schools, clinics, etc., throughout the U. S. have been contacted and it is hoped that the announcement that they have found an instructor for this position can be made soon.

The internal medicine course is scheduled for 1949-50. When announcement letters are sent to the members of the association, physicians are urged to mail enrollments promptly to the state office. It seems incongruous to the committee that it is necessary to send out representatives from the executive office to do the enrolling for these courses. If each physician will cooperate by mailing his enrollment, this will eliminate extra expense and help in making these programs become self-supporting.

The continuous interest in the postgraduate instruction in our state is gratifying, the committee emphasized. Many comments from the physicians taking the course are in line with the following: "I am very much pleased with this type of postgraduate work. I find it difficult to go away for days or weeks to take some work which I feel I need badly. Consequently, this type of course is about my only opportunity. I wish it were possible to have two such courses each year."

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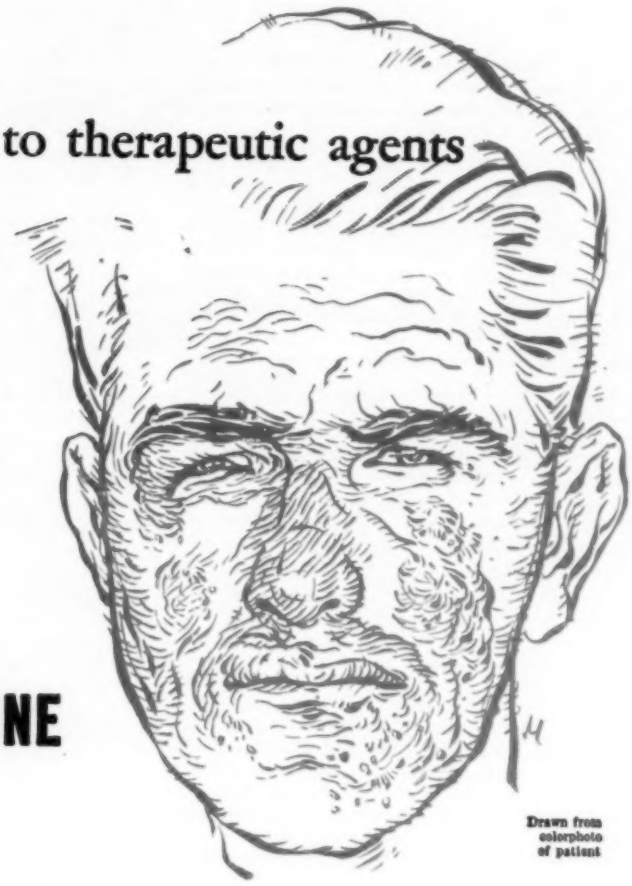

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MEDICAL ABSTRACTS

UEBER ERBRECHEN NACH TONSILLECTOMIE (Vomiting After Tonsillectomy). Laszlo Kolezar. Monatsschrift fur Ohrenheilkunde und Laryngo-Rhinologie. Wien. 82:309-314 (July) 1948.

There are a number of patients who complain of nausea and vomiting after tonsillectomy. Their complaint may last for several days, and the continuous vomiting may lead to postoperative bleeding. If the patient vomits one has to examine the operative wound to see whether a beginning hemorrhage is the cause of nausea. Vomiting a few hours after operation may be caused by presence of blood in the stomach which flowed there during the operation. In such a case the vomited blood is dark red or black, and the vomiting is usually not repeated.

If the inspection of the wound does not reveal anything unusual, the vomiting may be the result of preliminary medication or a postoperative acidosis. Ten cc. of a 10 per cent glucose solution, together with 20 units of insulin may cure such postoperative acidosis. Of course, one should remember that a shift in the acid base equilibrium of the body may be just a general chemical reaction of the organism as fever is a general physical reaction and leukocytosis is a general cellular reaction.

Under normal conditions the reaction of the blood is stable owing to the buffer substances produced by the various organs. In acidosis the production or the availability of such buffer substances is lowered. In an injured tissue the chemical reaction becomes acid, and the grade of acidosis depends upon the presence of inflammatory reactions and upon the type of infection. The locally produced excess acid is excreted by the kidneys in the urine. Postoperative acidosis may become as serious as diabetic acidosis, and it may lead to coma. Symptoms of severe acidosis are continuous, severe vomiting, fever, rapid pulse, occasionally coma; the urine always contains acetone bodies. The pH of the urine is strongly on the acid side.

Considering the general pathology of acidosis it is very probable that in certain persons who show vomiting after tonsillectomy the liver is also damaged either by the premedication or by the toxins of tonsillitis. It is also possible that the customary one-day fasting before the operation predisposes the organism to postoperative acidosis.

In a series of 200 tonsillectomies the author observed 15 cases with postoperative acidosis and vomiting. In all cases the administration of 10 cc. of a 10 per cent glucose solution with 20 units of insulin completely stopped nausea and vomiting.

Even in tonsillar abscess the author performs tonstillectomy *chaud*, injecting a two per cent novocain solution into the site of operation. He did not observe any complication after this procedure. The tonsil of the seemingly healthy side is also excised, in many cases revealing a beginning or a latent abscess.—Marvin D. Henley, M.D.

CARCINOMA OF THE LIP. James E. Cross, Eugene Guralnick and Ernest M. Daland. S.G.&O., 87:2:153-163 (August) 1948.

"Carcinoma of the lip, one of the most malignant neoplasms of the oral cavity, is one of the most readily curable malignancies encountered in the body. Because of the prominent location it is usually brought to the attention of the patient at an early stage and, therefore, should be seen by the physician while still amenable to treatment. This study was undertaken in an effort to evaluate the results of treatment of all patients with carcinoma of the lip either seen in the out-patient clinic or admitted to the Pondville hospital from the time of its establishment in June, 1927, to December, 1941. This particular period of time was chosen in order to have a complete five year follow-up record on all the patients who received treatment.

"The records of 563 patients with carcinoma of the lip constituted the series for review and consideration. These cases were 2.9 per cent of the 19,664 new patients examined in the out-patient department during the period covered by the study.

"It was hoped that by a critical study of a relatively large series of cases certain criteria could be established from which it would be possible to outline the method of therapy most likely to be successful in a given case and to give a reasonablly accurate prognosis at the outset of treatment.

CONCLUSIONS

"1. Carcinoma of the lip is the most readily curable malignant tumor of the oral cavity, and treatment of 401 unselected cases at the Pondville hospital resulted in 67.1 per cent three year cures. Of the patients who received all their treatment at Pondville 81.4 per cent achieved three year cure status.

"2. Surgery is the preferred method of treatment at the Pondville hospital.

"3. Three year cures are as significant statistically as five year cures in carcinoma of the lip.

"4. Carcinomas of the labial commissures are approximately twice as difficult to control as lesions in other locations on the lips.

"5. Curability of carcinoma of the lip is directly related to the size and pathological grade of the primary tumor and the presence (or absence) of lymph node metastases.

"6. It was found that 35.9 per cent of the patients who underwent neck dissection, with pathological proved cervical lymph node metastases, attained the three year cure stage.

This informative article is abstracted and presented for study because it shows concretely what can be done for carcinoma of the lip. Secondly it emphasizes the importance of early diagnosis and the institution of the proper treatment. Thirdly it proves the value of good follow-up examinations of all carcinoma patients.—John F. Burton, M.D.

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MEDICAL ABSTRACTS (Continued)

SNORING. The Journal of Laryngology and Otology. Ian G. Robin. London. 62:540-543 (August) 1948.

Snoring is a seemingly trivial matter, yet it may ruin an otherwise happy marriage; it is even a basis for divorce in some parts of the U.S.A. The problem of snoring has been studied by anatomists and orthodontists.

Though noisy respiration may be produced by various structures in the respiratory tract, the term snoring should be limited to sounds made by vibrations in the soft palate and posterior faucial pillars during sleep. Snoring is usually produced during inspiration through the mouth, sometimes by ordinary breathing through the nose. It is an involuntary act.

Pharyngoscopic observations showed that in a snore the thin edge or velum of the posterior faucial pillars is the vibrating part. In order to bring about such a vibration it is necessary that the reservoir air in the nasopharynx be at a low ebb; that a special position be reached in the relationship of tongue and soft palate; also that the texture of the velum and the thickness of the tissues be of a special kind. The pitch of snore depends on density, elasticity and size of the vibrating part.

The soft palate must be free to vibrate. A short *ramus mandibulae,* therefore, predisposes to snoring because it makes the palate lie away from the dorsum of the tongue. Certain sleeping positions also predispose to snoring because they determine the position of the tongue in relation to the palate. Sleeping on one's back causes the tongue to fall back so that it approaches the velum of the fauces and snoring may result. Presence or absence of teeth has little influence on the production of a snore. Certain types of dental orthodontic splints can mold the dental alveolar pattern and can lead to less mouth-breathing.

The tone of the glossopharyngeal musculature is a decisive factor in snoring. It influences positioning and elasticity of the parts. It is told that the pharyngeal muscular behavior is a pattern governed by the central nervous system and inherited by birth. Thus, snoring would be one of the hereditary predispositions. Those who want to be modern in their explantions of snoring assert that during sleep there is a fall in suprarenal secretion; this leads to a rise in parasympathetic over sympathetic action, and therefore a diminution of tone in the palatal structures.

In anesthetized patients sounds just like snoring are also heard, though there are many who state that this is not real snoring. Even man-apes will snore during anesthetization. These sounds during anesthesia can be explained by relaxation of the glossopharyngeal musculature.

Other factors in snoring may be too numerous such as slight edema of the palatal mucosa, slight pharyngitis due to working indoors or resulting from smoking, obesity, plethora, allergy. Any granulomatous condition in the pharynx may lead to snoring. Other causes may be: (1) nasal obstructions, e.g., septal deflection, collopsed alae nasi, moderate mucosal congestion; (2) pathological changes in the pharynx; and (3) functional derangements of the central reflex governing the tone of glossopharyngeal musculature.

What to do with a snoring person? Amputation of the uvula is no relief. Removal or prevention of nasal obstruction may be beneficial. A person may be prevented from sleeping on his back by sewing a cotton reel into the back of his pajamas, etc. Timely removal of enlarged tonsils and adenoids is the best measure to reduce the number of potential snorers.—Marvin D. Henley, M.D.

DO YOU KNOW?

That at least two O.S.M.A. members make calls to rural areas in their private planes? Information gained in a survey conducted by the Oklahoma Aviation Commission revealed that O. C. Newman, M.D., Shattuck, and W. E. Seba, M.D., Leedey, make calls in their own planes. Several other O.S.M.A. members are known to be "physician pilots" but Dr. Seba and Dr. Newman are the only ones known to make calls via airplane. Should *your* name be added to the list? If so, please let us know as the Aviation Commission and the Executive Office would like to have a complete "fliers' file."

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Beckham	T. J. McGrath, Sayre	J. B. McGolrick, Erick	Second Tuesday
Blaine	Fred Perry, Okeene	Virginia Curtin, Watonga	Third Thursday
Caddo	Joseph Henke, Hydro	Edward T. Cook, Jr., Anadarko	Third Thursday
Canadian	J. N. Goldberger, El Reno	Jack W. Myers, El Reno	Subject to Call
Carter	C. D. Cunningham, Ardmore	Roger Reid, Ardmore	Second Tuesday
Cherokee	P. H. Medearis, Tahlequah	R. K. McIntosh, Jr., Tahlequah	First Tuesday
Choctaw-McCurtain-Pushmataha		Fred D. Switzer, Hugo	
Cleveland	Phil Haddock, Norman	James F. Hohl, Norman	Fourth Thursday
Comanche	Byron W. Aycock, Lawton	E. Stanley Berger, Lawton	Second Tuesday
Cotton	G. W. Baker, Walters	Mollie Scism, Walters	Third Friday
Craig	C. P. Chumley, Vinita	J. M. McMillan, Vinita	
Creek	P. K. Lewis, Sapulpa	Louis A. Martin, Sapulpa	Second Tuesday
Custer	J. G. Wood, Weatherford		Third Thursday
Garfield	J. Wendell Mercer, Enid	Roscoe C. Baker, Enid	Fourth Thursday
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Grady	L. E. Woods, Chickasha	Wesley W. Davis, Chickasha	
Greer	Fred Sellers, Mangum	J. B. Hollis, Mangum	
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Haskell	William S. Carson, Keota	N. K. William, McCurtain	
Hughes	L. A. S. Johnston, Holdenville	Paul Kernek, Holdenville	First Friday
Jackson	J. M. Allgood, Altus	J. Harold Abernathy, Altus	Last Monday
Jefferson	H. A. Rosier, Waurika	O. J. Hagg, Waurika	Second Monday
Kay-Noble	Glenn Kreger, Tonkawa	E. C. Mohler, Ponca City	Second Thursday
Kingfisher	H. Violet Sturgeon, Hennessey	Henry C. Trzaska, Hennessey	
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LeFlore	John H. Harvey, Heavener	Rush L. Wright, Poteau	
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Ottawa	F. L. Wormington, Miami	W. Jackson Sayles, Miami	Second Thursday
Payne-Pawnee	Clifford M. Bassett, Cushing	C. W. Moore, Stillwater	Third Friday
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Pottawatomie	Jack W. Baxter, Shawnee	F. C. Gallaher, Shawnee	Third Wednesday
Rogers	P. S. Anderson, Claremore	M. E. Gordon, Claremore	
Seminole	Claude Chambers, Seminole	Mack I. Shanholtz, Wewoka	Third Wednesday
Stephens	Fred Patterson, Duncan	W. R. Cheatwood, Duncan	Third Wednesday
Texas		E. L. Buford, Guymon	
Tillman	G. A. Tallant, Frederick	O. G. Bacon, Frederick	Second and Fourth
Tulsa	Victor K. Allen, Tulsa Medical Arts Bldg.	John G. Matt, Tulsa Mr. Jack Spears, Exec. Secty.	Monday
Washington Nowata	L. B. Word, Bartlesville	C. L. Johnson, Jr., Bartlesville	Second Wednesday
Washita	A. H. Bungardt, Cordell	Aubrey E. Stowers, Sentinel	Last Tuesday
Woods	R. A. Whiteneck, Waynoka	W. F. LaFon, Alva	Odd Months

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